ICP DAS PMC-5151 User Manual

[Version 3.0.2]

ICP DAS CO., LTD.

泓格科技股份有限公司

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1 PMC-5151 Introduction

The PMC-5151 is an intelligent Power Meter Concentrator developed by ICP DAS. It features various functions such as: power data management, logic control, data logger and alarm notification functions. By using PMC-5151 solution; it is no longer required to write programming for power management system. It takes only a few clicks on the specific Web HMI Interface provided by PMC-5151 to complete power management and logic control settings for monitoring the power meters connected to the system. This easy-to-use solution will dramatically reduce the labor and cost spent on power monitoring and management system.

PMC-5151 allows connections to ICP DAS power meters via RS-485 or Ethernet interface to read the power data of the devices measured by the power meters; and then real-time record the power data in the data file. PMC-5151 also provides data logger file auto send-back function; together with PMC Data Server software or SCADA software, it allows collection and analysis of the power data.

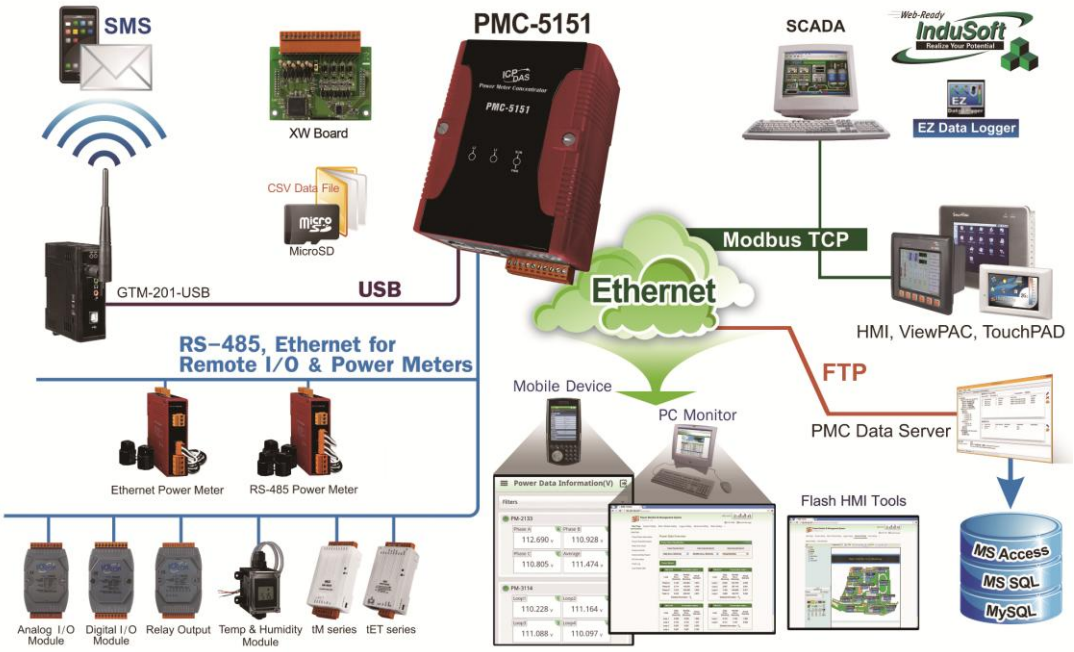


Figure1-1 : PMC-5151 System Architecture

With the built-in Web Server, it allows connection to PMC-5151 for power meter parameters and system settings via browser and allows viewing the real time or historical power data of the power meters. In addition to power data monitoring function, the PMC-5151 also could connect to ICP DAS XW-Board, M-7000 I/O modules and standard Modbus RTU/TCP Slave modules. By working with the I/O

modules, and functions such as IF-THEN-ELSE logic rule execution and Email/SMS Alarm Notification, PMC-5151 offers more thought-out power demand management and alarm notification functions, and is able to perform load shedding of the devices if required, and enables real-time monitoring and control of the power consumption of the devices. At the same time, with the Data Logger function on microSD card, the PMC-5151 could real-time record the power data and I/O channel data, and automatically sends back the data file to management center for further statistics and analysis.

In addition to the standard power data review page, by using the Flash HMI web page editor function on PMC-5151, the users could easily design a specific power monitoring page by a few clicks on browsers. PMC-5151 also offers Modbus TCP/RTU Slave function that allows SCADA software or HMI devices to connect to PMC-5151 to get real-time power data of the devices via Modbus TCP/RTU protocol.

When using PMC-5151 to build a power management and monitoring system, during the whole process of system development, no programming is required; it takes a few clicks on web page to complete all settings; it is easy for the user to quickly view the power data of the devices and furthermore process the data for statistics and analysis. The PMC-5151 is an easy-to-use and easy-to-build total solution for power management and monitoring that makes more efficient energy usage.

PMC-5151 features:

- Web-Based Operation
  - ◆ No extra software tool is required; all operations can be done through the Web browsers to build a power monitoring & management solution.
  - ◆ Built-in Web Server allows to set up the parameters of the power meters and view power data via browsers.
- Power Data Display
  - ◆ Support ICP DAS Modbus TCP/RTU power meters.
  - ◆ Display real-time or historical power data (in data table or chart form).
  - ◆ Provides Daily and Monthly power data report.
  - ◆ Offer Flash HMI Tools for easy HMI Web interface design.
- Power Data Log
  - ◆ Provides real-time power data log of the power meters (in csv format).
  - ◆ Automatically send back power data files at scheduled time via FTP.
  - ◆ Allow to recover Data Log files when the network is resumed after temporary network disconnection.

- ◆ Together with PMC Data Server software, it allows to import the content of the power data files into the Database system.

- Power Demand Management and Alarm Notification
  - ◆ With built-in IF-THEN-ELSE logic engine that enables thought-out power demand management functions.
  - ◆ Support ICP DAS XW-Board, M-7000 I/O modules and standard Modbus RTU/TCP Slave modules for real-time I/O control and monitoring.
  - ◆ Provides Schedule function for device operation control.
  - ◆ Provides alarm message notification function via Email or SMS (for SMS message sending, GTM-201-USB is required).
- Others
  - ◆ Support Modbus TCP/RTU Slave protocol that allows seamless integration with SCADA software.
  - ◆ Offers access management for logic rule settings and encoded function for the content to avoid unauthorized access to the system.

This document is intended to give you a full-range instruction to PMC-5151. You will be able to learn how to connect to power meters and I/O modules, how to display and log the power data, how to edit logic of the rules and how to download the rules to the PMC-5151 for conditional execution.

2 Before Installation

Modify PMC-5151‘s network settings to fit current network environment settings, and the default network settings of PMC-5151 is as follow:

- IP：192.168.255.1
- Subnet mask：255.255.0.0
- Gateway address：192.168.0.1
- DNS Server address：8.8.8.8 (default: Google DNS Server)

Steps

(1) Modify the network settings of the PC or Notebook to be the same network segment as PMC-5151. For example:
   - IP：192.168.255.10
   - Subnet mask：255.255.0.0
   - Gateway address：192.168.0.1

(2) Connect PMC-5151 **LAN1** to PC by network cable. (PMC-5151 is capable of auto-crossover)

(3)Start the browser and input http://192.168.255.1 in the address bar.

(4)Input default administrator password “Admin” to login into the page.

(5) After login in PMC-5151 web page, go to System Setting Network Setting, modify the network setting to fit current network environment. More detailed setting information please refer to 6.2 Network Setting.

(6) Save the settings and connect PMC-5151 to the network.

Please Note:

1. Before installing PMC-5151, please finish the hardware installation of the ICP DAS Power meter modules, and make sure all wiring connections are accurate.
2. If there are the M-7000 modules or Modbus TCP/RTU Slave modules which will connect with PMC-5151, please also finish the hardware installation of the M-7000 modules or Modbus TCP/RTU Slave modules, and make sure all wiring connections are accurate.
3. One PMC-5151 allows connections to at most 24 ICP DAS Modbus power meters (including Modbus RTU and Modbus TCP power meters.).
4. One PMC-5151 allows connections to at most 8 Modbus TCP/RTU Slave I/O modules.
5. A single I/O interface (COM2, COM3 or LAN) allows connections to at most 16 devices (Power meters and I/O modules).

3 System Login

When connect to PMC-5151 webpage server via Web browser (IE 8 / Firefox 3.6 / Chrome 14.0.8 version or above are recommended), in order to get a better operation experience, 1280x1024 resolution is recommended. The Login page of PMC-5151 is shown as below:

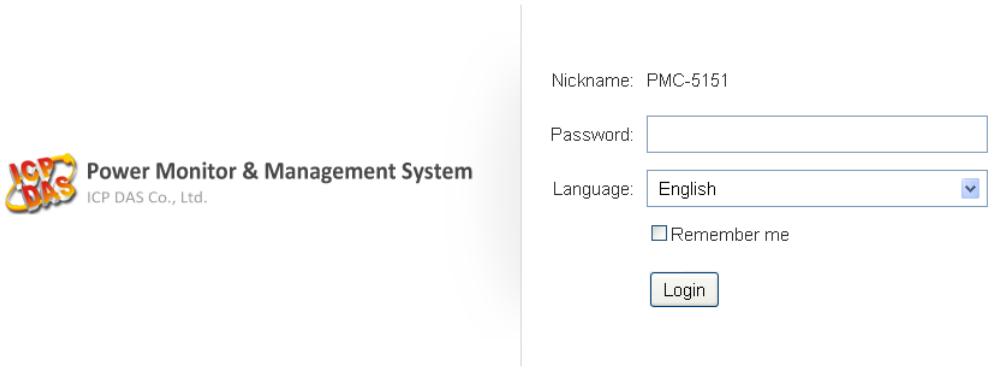


Figure3-1 : PMC-5151 Login page

By inputing different passwards, two levels of authority are granted as follow:

- **Administrator (Default password: Admin)**
  Login as an administrator allows performing settings and reviewing of system information, power meter information and I/O modules information, it also allows performing Logic rule edition. Only one administrator is allowded to login into the system at the same time.
- **General User (Default password: User)**
  General users are allowed to view power meter data and I/O module information only; they are not allowed to perform any settings. It allows maximum 5 general users to login and get into the system at the same time.

Select your preferred language from the dropdown list in the “Language” field for the Web page user interface (English, Traditional Chinese, Simplified Chinese). After login into the system, if the user want to change the language again, logout and re-select the language on the Login page.

Please note: Before starting the system, please make sure the browser you are using already enable JavaScript support and has the latest version of Adobe Flash Player installed, otherwise the system will not function properly.

4 System Main Page

After login into the system, PMC-5151 default home page will be displayed, and will automatically read settings of the PMC-5151 to the webpage.

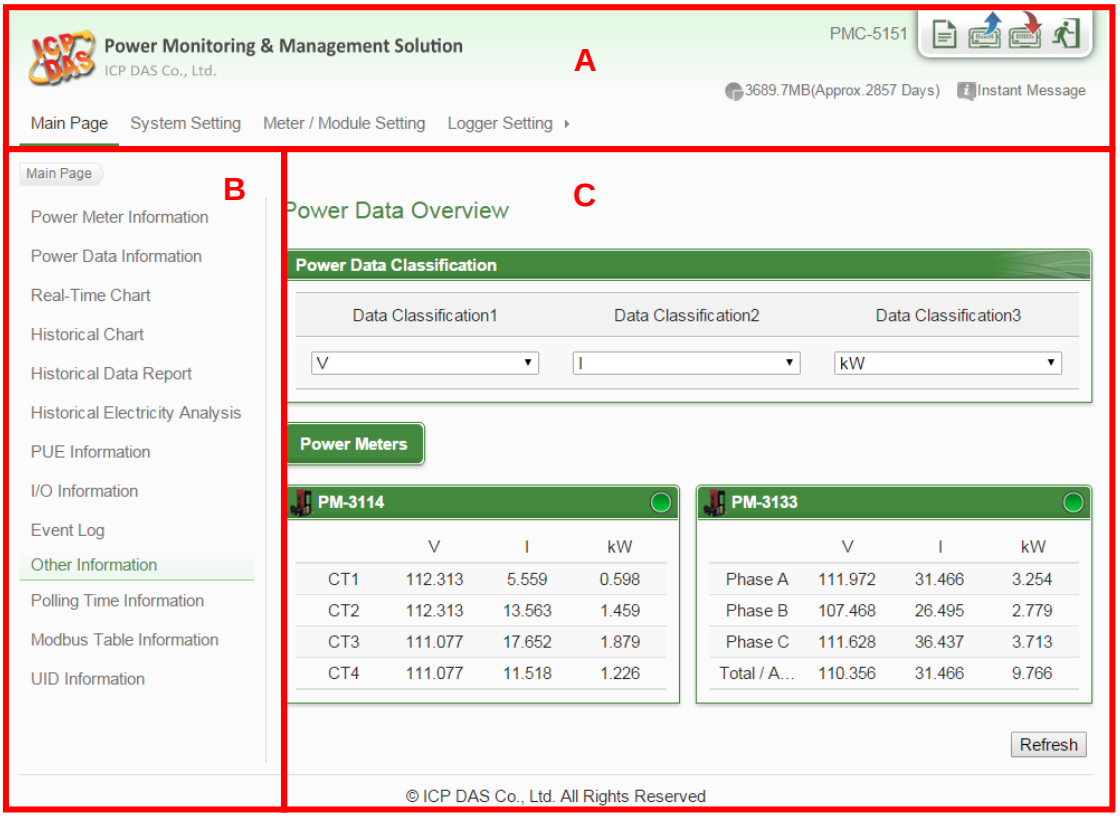


Figure4-1 : PMC-5151 Main Page

PMC-5151 main page could be divided into 3 areas:

A. System function area
B. Sub-function area
C. Data review/System setting area

More detailed information for each area will be given in the following section.

4.1 System function area

System function area provides immediately access to the main functions of PMC-5151, such as: system settings, system real-time information display, rule files management, etc, shown as below:

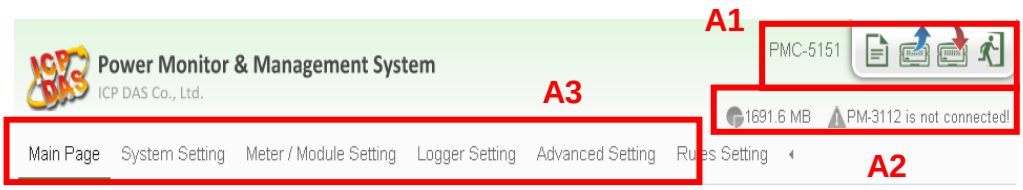


Figure4-2 : System Function Area (login as a Administrator)

System function area includes the following areas:

A1. Rules management toolbar

A2. Real-time information area

A3. System function toolbar

When login as a general user, the setting functions in Rules management toolbar and System function toolbar will be locked, and only allows viewing the power meter data, the I/O module data and Real-time system information. The interface is shown as below:

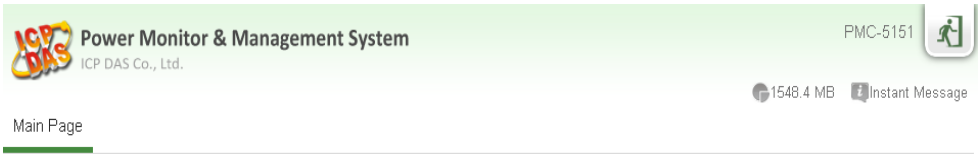


Figure4-3 : System Function Area(login as a General user)

Each function in system function area is as the flowing:

4.1.1 Rules management toolbar

Rules management toolbar allows user to perform different functions. When login into the system as the administrator, the rule management toolbar will be shown as below:

Figure4-4 : Rules management toolbar (login as a Administrator)

If login as a general user, the rule management toolbar will be shown as below:

Figure4-5 : Rules management toolbar (login as a General user)

The functions of the Rules management toolbar are as follow:

- "New" button allows resetting the settings of all parameters and Rules. Click on button and click on "OK", the settings on PMC-5151 webpage on the browser will be cleared. If the user would like to clear the setting on PMC-5151, then continue to click on "Save" button to save the new settings (cleared settings) to the PMC-5151.

  Please note: once the settings are cleared and save to the PMC-5151, the settings will be cleared permanently.

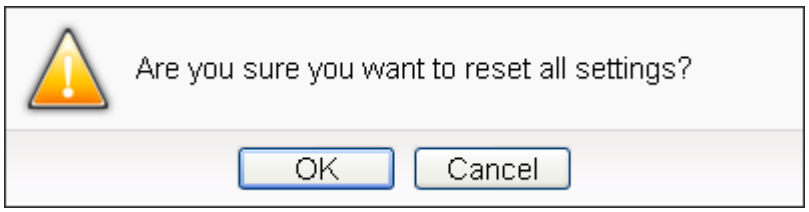


Figure4-6 : Confirm to clear settings

- "Load" button allows to load all parameter settings and rule settings on PMC-5151. Click on button and click "OK" to load all parameter settigns and rules settings from PMC-5151 to the web page for further edition.

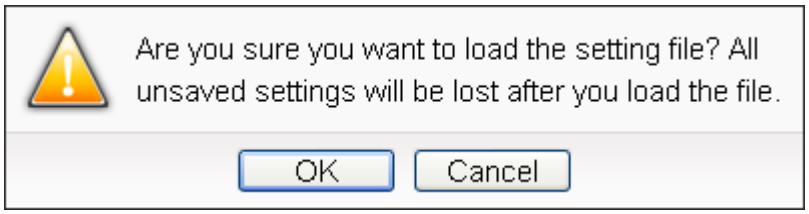


Figure4-7 : Confirm to load settings

- "Save" button allows to save all parameter settings and Rule settings to PMC-5151. Click on button and click "OK" to save all parameter settings and Rule settings from the web page of PMC-5151 to the PMC-5151.

Figure4-8 : Confirm to save settings

- "Logout" button allows to log out the system, click on button and click "OK" to logout the system.

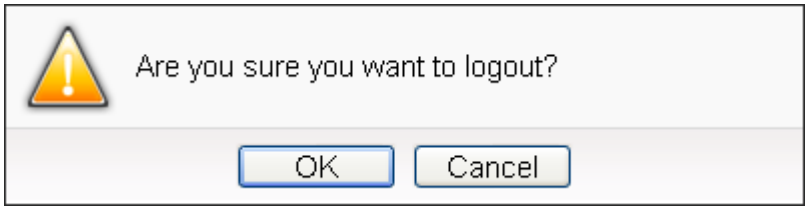


Figure4-9 : Confirm to logout (The settings are saved)

If the settings are not saved to the PMC-5151 before performing logout, a warming message will appear as below:

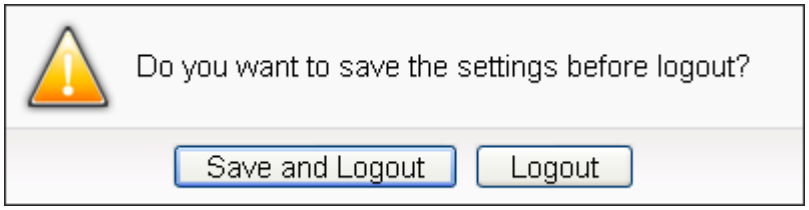


Figure4-10 : Confirm to logout (The settings are not saved)

Please note:

1. All the edited settings on the webpage have to be saved to PMC-5151 to make all settings take effect; before click on button, the settings will only be saved on the Web page site, not in the PMC-5151.
2. Please DO NOT logout or close the web page during the process of the edition, otherwise all pre-set settings on the page will be disappeared.

In addition, on the left side of the Rules management toolbar, the user could give a nickname for this PMC-5151 in the nickname field for easy recognition.

4.1.2 Real-time information area

Real-time information area allows display of current free space and approximate number of days available to save of the microSD card of the PMC-5151 and the real-time system information, shown as below:

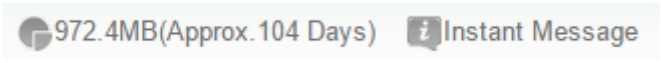


Figure4-11 : Real-time information area

- 972.4MB(Approx.104 Days) Allows display of the current free space and approxmiate number of days available to save of the micro SD card in PMC-5151.
- Instant Message Allows display of real-time system information, click on “Instant Message”to open up the list of real-time information, maximum 10 information will be kept on the list.

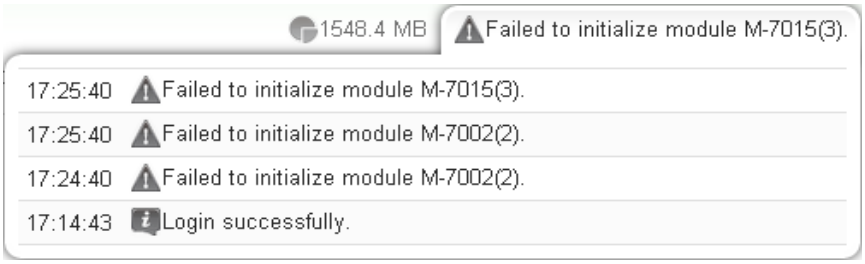

1548.4 MB
Failed to initialize module M-7015(3).
17:25:40 Failed to initialize module M-7015(3).
17:25:40 Failed to initialize module M-7002(2).
17:24:40 Failed to initialize module M-7002(2).
17:14:43 Login successfully.

Figure4-12 : Real-time information list

4.1.3 System function toolbar

According to the level of login permission, the System function toolbar will be different. If login as an administrator, all parameter settings and data review function will be enabled; more detailed information of the functions will be give in the following sections.

The System function toolbar includes the following function options:

- Chapter 5: Main Page
- Chapter 6: System Setting
- Chapter 7: Power Meter/ I/O Module Setting
- Chapter 8: Data Logger Setting
- Chapter 9: Advanced Setting
- Chapter 10: Rule Setting

If login as a general user, they are allowed to view Main Page only; they are allowed to view real-time information on Main Page, however, they do not have permission to edit the settings of the parameters and the rules.

4.2 Sub-function area

Sub-function area will display detailed functions under the selected System function. The user could edit or review detailed function options in the Sub-function area. On the upper Sub-function area, the path of current function will be displayed to show the current function path.

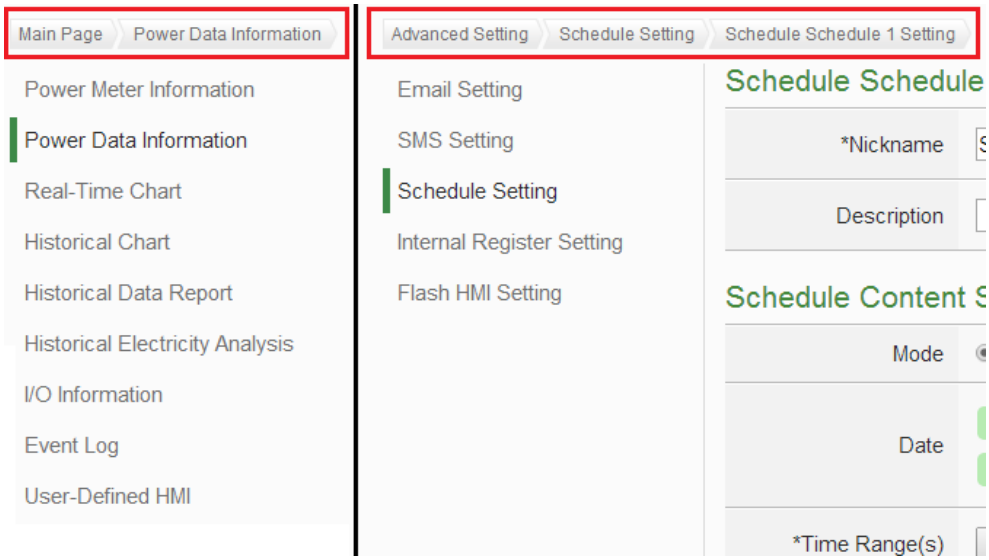


Figure4-13 : Current function path

4.3 Data review/System setting area

Data review/System setting area allows to set system parameters and data review of PMC-5151, the content of this area will be varied according to the sub-function selected. When the user login into the page, the Data review/System setting Area of the Main Page will be Power Data overview page, it will display all power information of the power meters that are connected to the PMC-5151, shown as below:

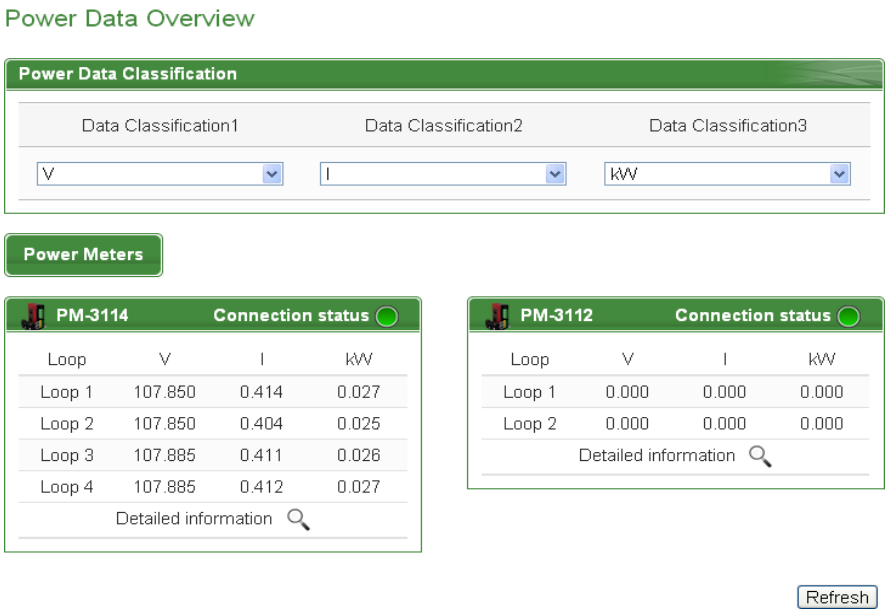


Figure4-14 : Power data Overview page

Power data overview page display the power data of the power meters that connected to the PMC-5151. Depend on the requirement to select the desired classification of the power data to display the desired power data. The page refreshes every 20 sec, the user could also click “Refresh” button to refresh the data immediately.

The power data classification includes the following options:
V(Voltage), I(Current), kW(Real Power), kvar (Reactive Power), kVA (Apparent Power), PF (Power Factor), kWh, kvarh, kVAh, Daily Accumulated Electricity, Monthly Accumulated Electricity, Yearly Accumulated Electricity, Daily Carbon Emissions, Monthly Carbon Emissions, Yearly Carbon Emissions, Hourly Maximum Demand, Daily Maximum Demand, Monthly Maximum Demand, Actual Demand and Forecast Demand. The displayed power data will be varied according to the selected power data classification.

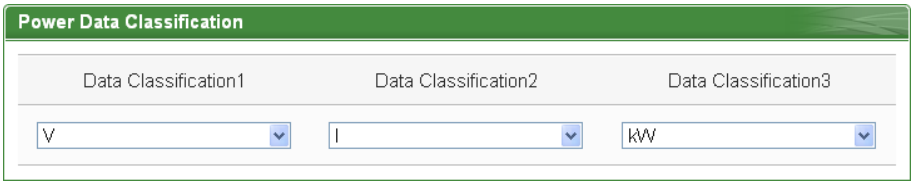


Figure4-15 : Select the classification of Power data

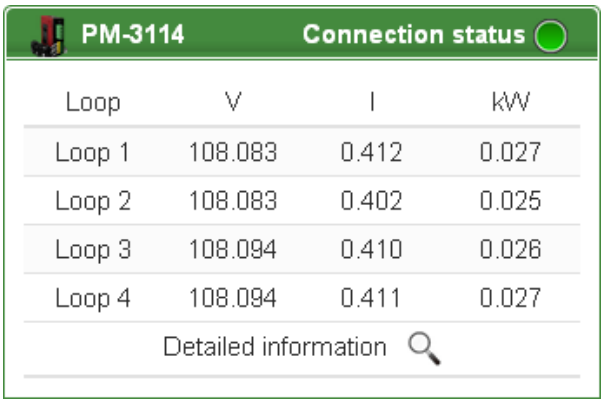


Figure4-16 : Display power data of the selected classification

- "Connection Status" will reveal the connection status between the power meter and PMC-5151, the graphic indicators are as follow:
  : Online : Offline : Connecting

5 Main Page

On the Main Page, 10 information display options are as follow: Power Meter Information, Power Data Information, Realtime Chart, Historical Chart, Historical Data Report, Historical Electricity Analysis, PUE Information, I/O Information, Event Log, Polling Time Information, Modbus Table Information and UID information, shown as follow:

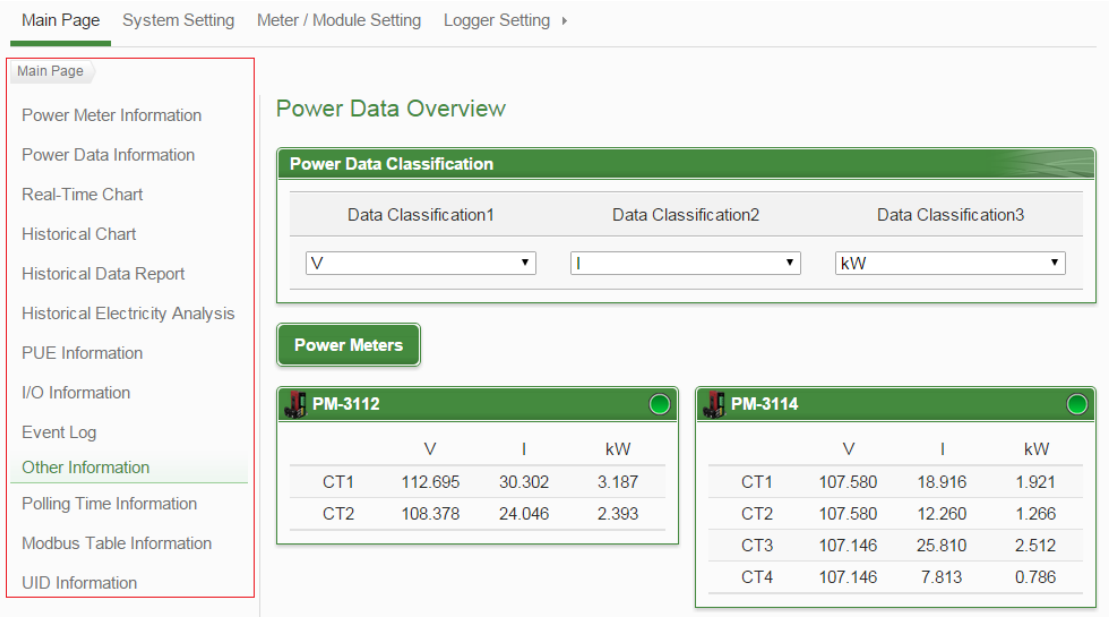


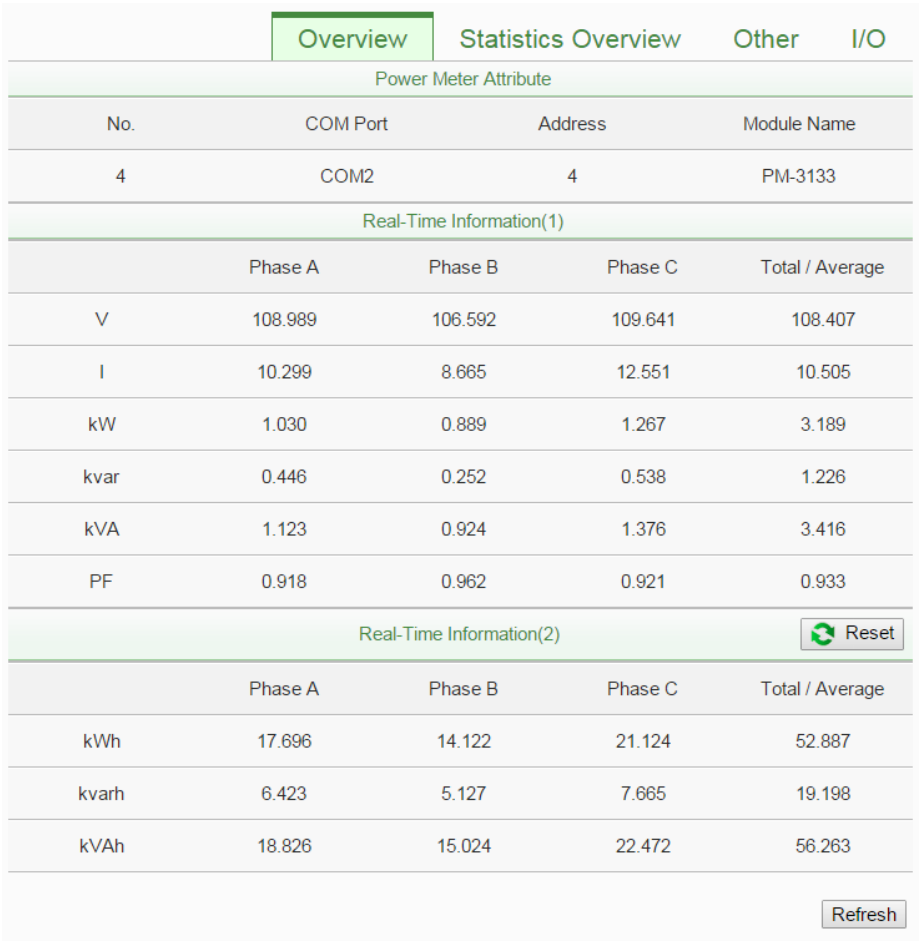
Figure5-1 : Information display options on Main Page

5.1 Power Meter Information

Power Meter Information page displays detailed power data information including: Power Meter Information Overview and Power Meter Statistics Information Overview.

5.1.1 Power Meter Information Overview

After getting into this page, the system will display real-time power information of the selected power meter. To display desired power meter data information, select the power meter from the dropdown list of the “Power Meter List”. The page refreshes every 20 seconds, the user could also click “Refresh” button to refresh the data immediately. Power Meter Information Overview includes the following sections:



Overview | Statistics Overview | Other | I/O

Power Meter Attribute

No.	COM Port	Address	Module Name
4	COM2	4	PM-3133

Real-Time Information(1)

	Phase A	Phase B	Phase C	Total / Average
V	108.989	106.592	109.641	108.407
I	10.299	8.665	12.551	10.505
kW	1.030	0.889	1.267	3.189
kvar	0.446	0.252	0.538	1.226
kVA	1.123	0.924	1.376	3.416
PF	0.918	0.962	0.921	0.933

Real-Time Information(2) Reset

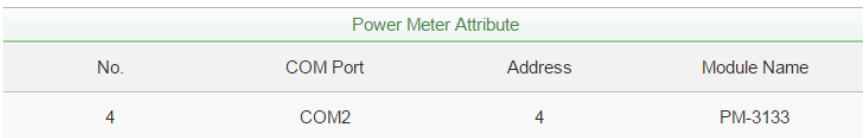
	Phase A	Phase B	Phase C	Total / Average
kWh	17.696	14.122	21.124	52.887
kvarh	6.423	5.127	7.665	19.198
kVAh	18.826	15.024	22.472	56.263

Refresh

Figure5-2 : Power Meter Information Overview

- Power Meter Attribute

  The Power Meter Attribute section will display different information according to different power meters and the ways they are connected to the PMC-5151. Currently PMC-5151 supports connecting to power meter via Modbus RTU (Figure 5-3) or Modbus TCP(Figure 5-4). If the power meter is connected via Modbus RTU, it will display the Power Meter Number (No.), Com Port, Address, Module Name. If the power meter is connected via Modbus TCP, it will display the Power Meter Number (No.), IP, Port, NetID, Module Name.



Power Meter Attribute

No.	COM Port	Address	Module Name
4	COM2	4	PM-3133

Figure5-3 : The attribute of PM-3133 Power Meter

Power Meter Attribute				
No.	IP	Port	NetID	Module Name
2	192.168.100.95	502	9	PM-3133-MTCP

Figure5-4 : The attribute of PM-3133-MTCP Power Meter

- Real Time Power Information

  In this section, it provides real time power data information of the selected Power Meter. For 3 phase power meter, it will display real time information of Phase A, Phase B and Phase C(Figure 5-5).For single phase power meter, it will display real time information of Loop 1, Loop2, Loop3, and Loop4(Figure 5-6). For PM-3112 will display real time information of Loop 1 and Loop2 (Figure 5-7).

Real Time Information(1)				
	Phase A	Phase B	Phase C	Total / Average
V	106.02	107.56	105.42	106.33
I	18.35	14.00	25.56	19.30
kW	1.88	1.41	2.53	5.84
kvar	0.48	0.52	0.93	1.94
kVA	1.95	1.51	2.69	6.16
PF	0.97	0.94	0.94	0.95
Real Time Information(2)				Reset
kWh	0.14	0.10	0.18	0.42
kvarh	0.05	0.03	0.06	0.14
kVAh	0.15	0.10	0.19	0.44

Figure5-5 : Real Time Power Information of PM-3133

Real Time Information(1)				
	Phase A	Phase B	Phase C	Total / Average
V	106.02	107.56	105.42	106.33
I	18.35	14.00	25.56	19.30
kW	1.88	1.41	2.53	5.84
kvar	0.48	0.52	0.93	1.94
kVA	1.95	1.51	2.69	6.16
PF	0.97	0.94	0.94	0.95
Real Time Information(2)				Reset
kWh	0.14	0.10	0.18	0.42
kvarh	0.05	0.03	0.06	0.14
kVAh	0.15	0.10	0.19	0.44

Figure5-6 : Real Time Power Information of PM-3114

Real Time Information(1)		
	Loop 1	Loop 2
V	109.14	112.11
I	31.59	26.11
kW	3.27	2.77
kvar	1.10	0.96
kVA	3.45	2.93
PF	0.95	0.95
Real Time Information(2)		Reset
kWh	65.22	52.45
kvarh	23.67	19.03
kVAh	69.38	55.80

Figure5-7 : Real Time Power Information of PM-3112

- Reset Accumulated Value of the Power Meter

  When login as the Administrator, it allows to click on “Reset” to reset the value of kWh, kvarh, and kVAh to be 0 if required.

  Please Note: After performing the reset function to reset the value of the kWh, kvarh, and kVAh of the selected power meter, the resetting operation is irreversible.

5.1.2 Power Meter Statistics Information Overview

On the Power Meter Statistics Information Overview page, the Demand Information section will display the Actual Demand, Forecast Demand, Contract Capacity, Hourly Maximum Demand, Daily Maximum Demand and Monthly Maximum Demand, etc. In the Statistics Information section, the Daily/Monthly/Yearly Accumulated Electricity and Daily/Monthly/Yearly Carbon Emissions for each loop will be displayed.

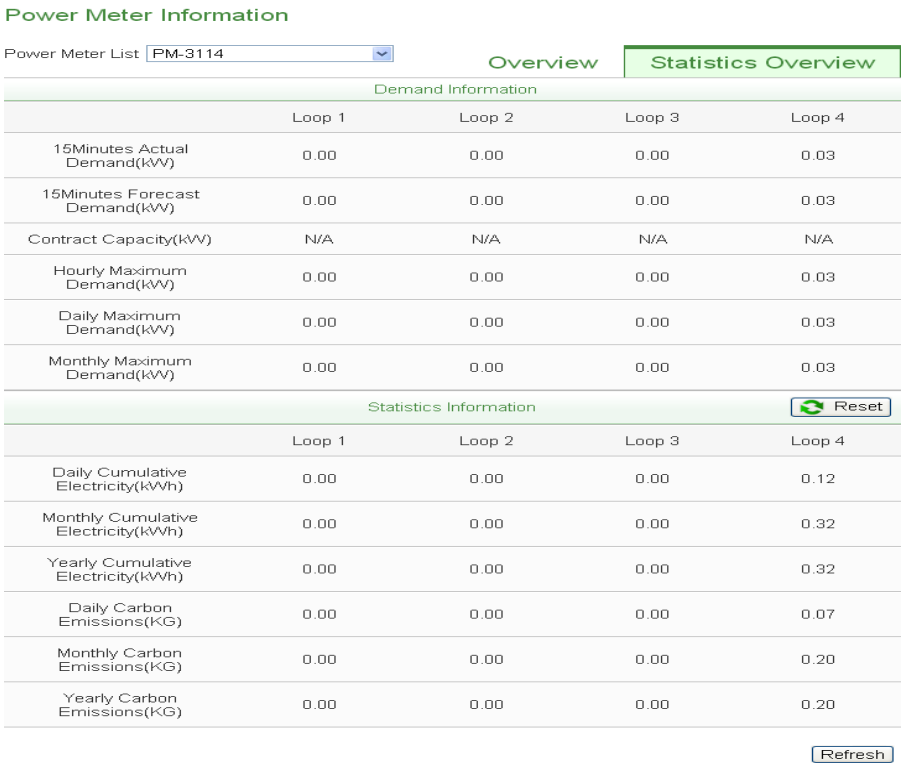

Power Meter Information
Power Meter List PM-3114
Overview
Statistics Overview
Demand Information
Loop 1 Loop 2 Loop 3 Loop 4
15Minutes Actual Demand(kW) 0.00 0.00 0.00 0.03
15Minutes Forecast Demand(kW) 0.00 0.00 0.00 0.03
Contract Capacity(kW) N/A N/A N/A N/A
Hourly Maximum Demand(kW) 0.00 0.00 0.00 0.03
Daily Maximum Demand(kW) 0.00 0.00 0.00 0.03
Monthly Maximum Demand(kW) 0.00 0.00 0.00 0.03
Statistics Information
Reset
Loop 1 Loop 2 Loop 3 Loop 4
Daily Cumulative Electricity(kWh) 0.00 0.00 0.00 0.12
Monthly Cumulative Electricity(kWh) 0.00 0.00 0.00 0.32
Yearly Cumulative Electricity(kWh) 0.00 0.00 0.00 0.32
Daily Carbon Emissions(KG) 0.00 0.00 0.00 0.07
Monthly Carbon Emissions(KG) 0.00 0.00 0.00 0.20
Yearly Carbon Emissions(KG) 0.00 0.00 0.00 0.20
Refresh

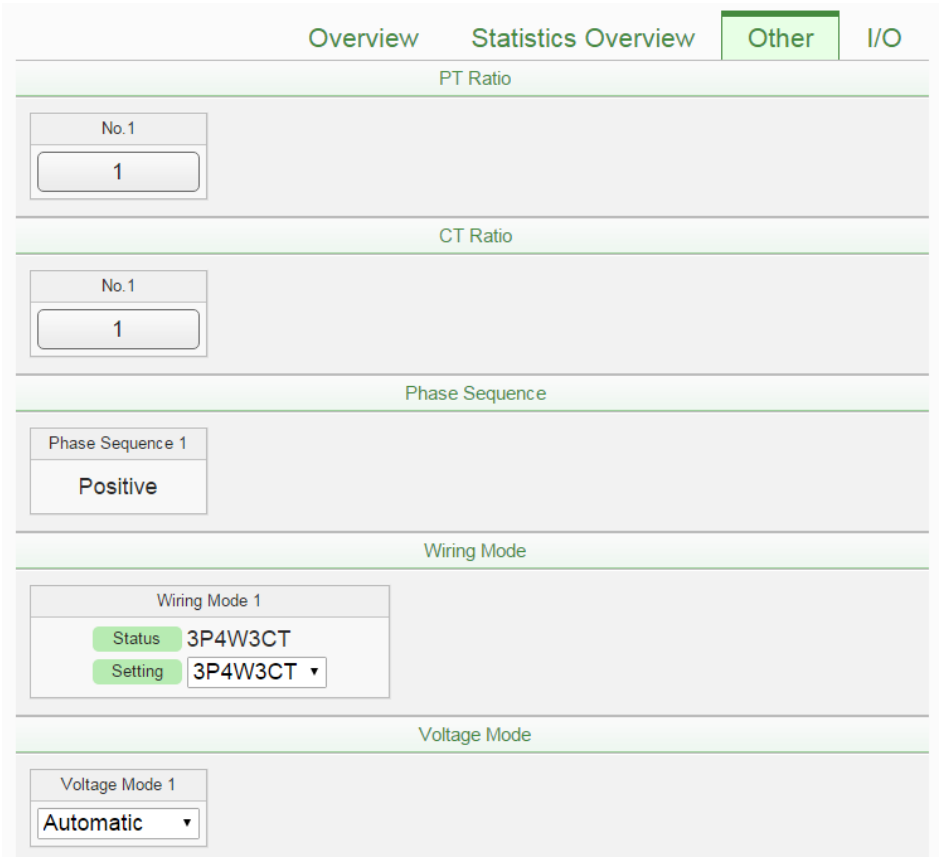
Figure5-8 : Power Meter Statistics Information

- Reset Power Meter Statistics information

  When login as an administrator; the user could click on “Reset” button to set the values such as: Daily/Monthly/Yearly Accumulated Electricity and Daily/Monthly/Yearly Carbon Emissions to default values if required.

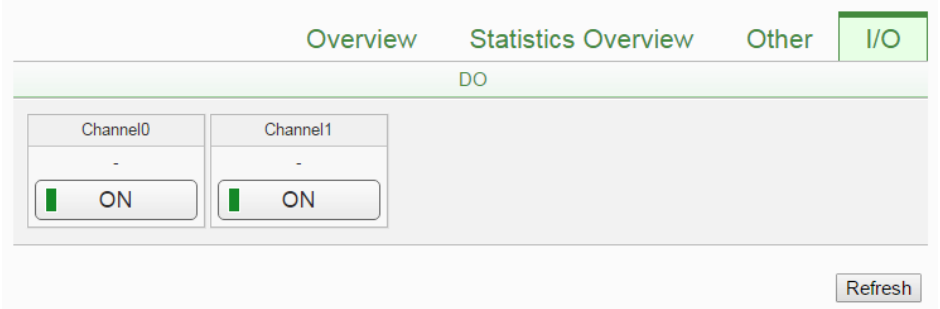
5.1.3 Other Information

In the "Other" information page, users can view or setup the PT Ratio、CT Ratio、Phase Sequence、Wiring Mode、Voltage Mode and other specific parameters of the power meter.



5.1.4 I/O Information

In the "I/O" information page, the I/O status of the power meter will be listed. When login as the Administrator, it allows click on “Status” to perform output operations. When login as a general user, it only allows to view I/O status, the output operation is not allowed.



5.2 Power Data Information

Power data information can be displayed in two modes (Overview and Group Overview), user can change the viewing mode according to the requirements; more detailed information will be introduced in the following sections.

5.2.1 Overview

Power Data Information overview mode allows display of power data of different power meters at the same time. Select the classification from the dropdown list of the Data Classification field; it will list the requested data from various power meters for easy comparison. The page refreshes every 20 seconds, the user could also click “Refresh” button to refresh the data immediately.

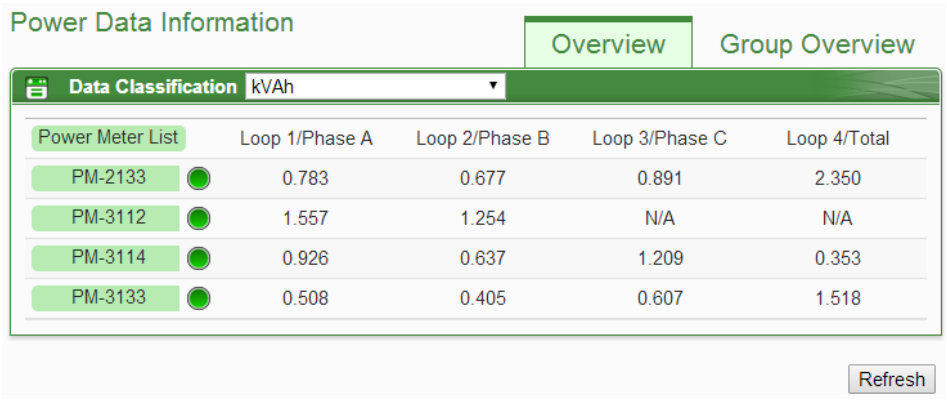


Figure5-9 : Power Data Overview Mode

The graphic indicators next to the power meter will reveal the connection status of the power meter, the indicators are as follow:

● : Online ● : Offline ● : Connecting

Click on “Change display list” (Figure 5-11) to bring up the Power Meter List window(Figure 5-12). Select the power meter to be displayed in the power meter list, click “OK” to complete the settings.

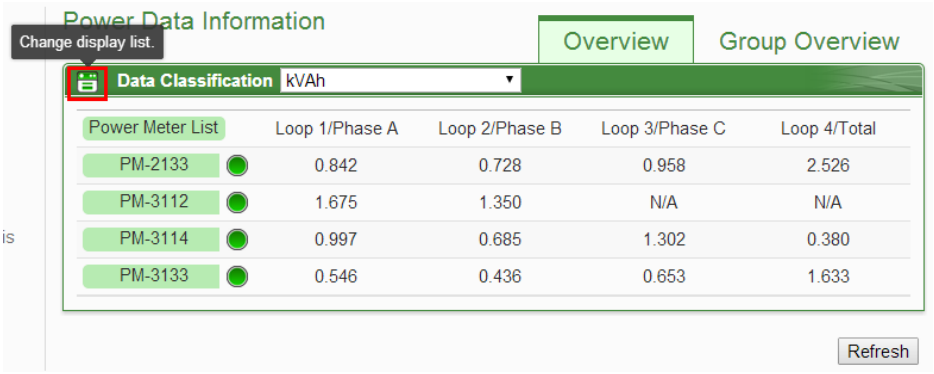


Figure5-10 : Change Display List Button

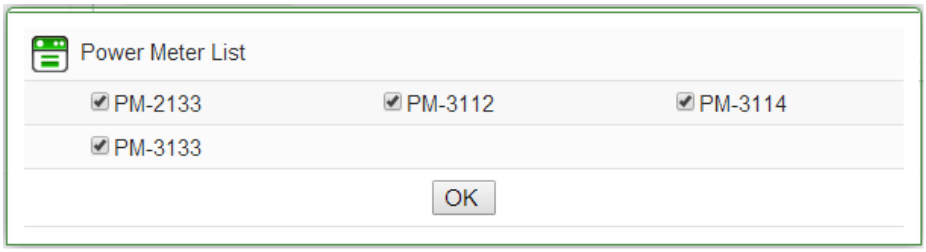


Figure5-11 : The Power Meter List

5.2.2 Group Overview

Power Data Information group overview mode allows display of power data of pre-set group of power meters (please refer to 6.8 Power Meter Group Setting). The page refreshes every 20 seconds, the user could also click “Refresh” button to refresh the data immediately.

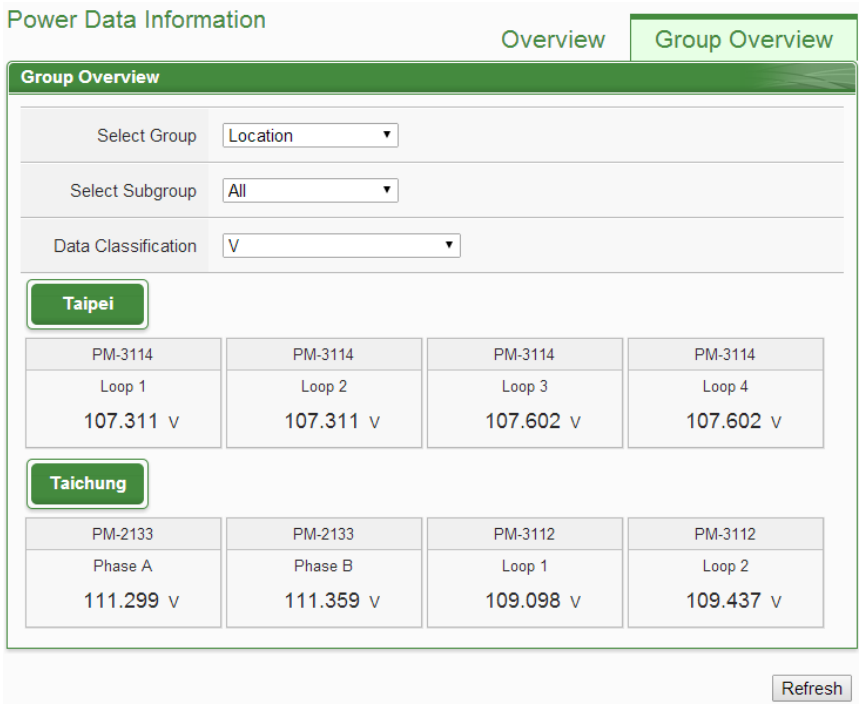


Figure5-12 : Power Data Group Overview Mode

◆ Select Group

Select the group from the dropdown list in the “Select Group” field. If no group is pre-set, the inquiry operation will be disabled.

◆ Select Subgroup

Select the subgroup from the dropdown list in the “Select Subgroup” field. User can select one subgroup to view or select “All” to view power datas of all subgroups.

◆ Data Classification

The power data classification includes the following options:
V(Voltage), I(Current), kW(Real Power), kvar (Reactive Power), kVA (Apparent Power), PF (Power Factor), kWh, kvarh, kVAh, Daily Accumulated Electricity, Monthly Accumulated Electricity, Yearly Accumulated Electricity, Daily Carbon Emissions, Monthly Carbon Emissions, Yearly Carbon Emissions, Hourly Maximum Demand, Daily Maximum Demand, Monthly Maximum Demand, Actual Demand and Forecast Demand. The displayed power data will be varied according to the selected power data classification.

5.3 Realtime Chart

Realtime Chart allows display of power information of the power meter in real-time trend and pie chart. Realtime Chart can be displayed in two modes (Power Meter mode and Group mode). The users can change the viewing mode according to their requirements. The detailed description is as follow:

5.3.1 Power Meter Mode

Select the power meter from the dropdown list of the Power Meter List and select the classification from the dropdown list of the Data Classification field, and then click on “Inquiry” button, it will show the chart.

- Power Meter List

  All power meter connected to the PMC-5151 will be list on the dropdown list of the Power Meter List, if no power meter is connected, the inquiry operation will not be able to perform.

- Data Classification

  Data Classification allows to inquire various power data options, including: V(Voltage), I(Current), kW(Real Power), kvar (Reactive Power), kVA (Apparent Power), PF (Power Factor), kWh, kvarh, kVAh, Daily Accumulated Electricity, and Actual Demand.

Please refer to Figure 5-14 for an example of Realtime Chart for “Power Meter Mode”. Each time the Realtime Chart displays only one power information classification. If a different power information classification is inquired, previously displayed chart will be closed automatically. The user could choose desired power data classification to view the corresponding Realtime Chart. The chart refreshes every 5 seconds.

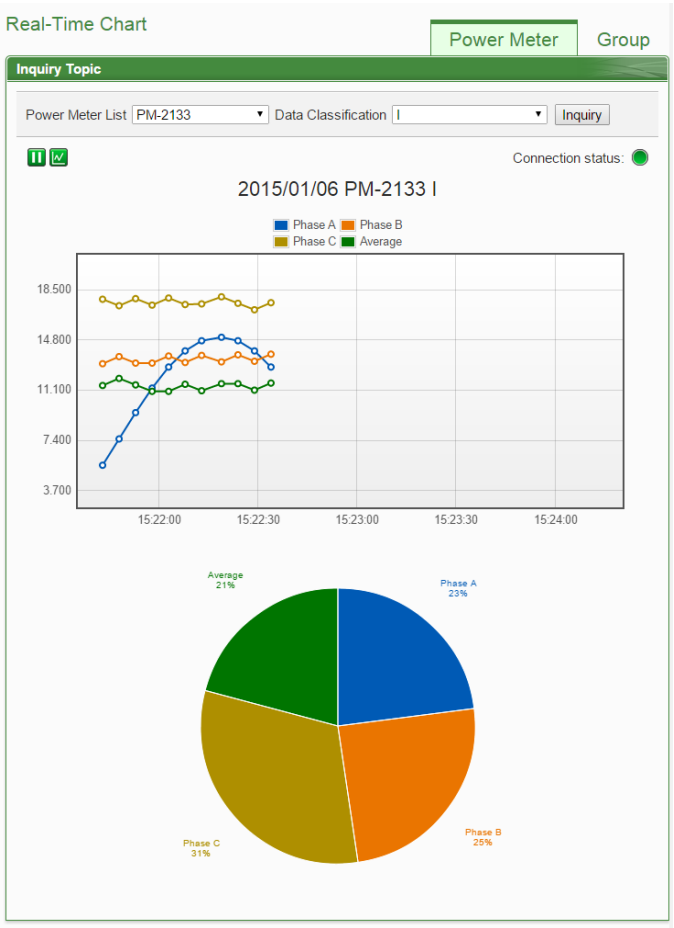


Figure5-13 : Realtime Chart (Power Meter Mode)

There are three function icons on the upper area of the Power Meter Realtime Chart:

- The icon allows to pause the update of the chart, only the data within the 25 minutes will be displayed. The user could click and drag on the chart and move forward or backward to show desired time zone. Click to resume the update of the chart. To view the data on a specific marker, move the mouse over the marker to display the data value.
- icon allows to hide the markers on the chart; click on button to show the markers on the chart.

- "Connection Status" will reveal the connection status of the power meter, the graphic indicators are shown as follow:
  : Online : Offline : Connecting

5.3.2 Group Mode

Select the option from the dropdown lists of the Group, Subgroup and the Data Classification field, and then click on "Inquiry" button, it will show the chart.

- Group
  The preset group lists will be shown on the dropdown list of the Group, if no group is pre-set, the inquiry operation will not be able to perform.

- Subgroup
  According to the selected Group option, the corresponding subgroups will be listed. If the selected Group contains no subgroup or the subgroup doesn't setup any loop/phase of the power meter, the inquiry operation will not be able to perform.

- Data Classification
  Data Classification allows to inquire various power data options, including: V(Voltage), I(Current), kW(Real Power), kvar (Reactive Power), kVA (Apparent Power), PF (Power Factor), kWh, kvarh, kVAh, Daily Accumulated Electricity, and Actual Demand.

Please refer to Figure 5-15 for an example of Realtime Chart for "Group Mode". Each time the Realtime Chart displays only one power information classification. If a different power information classification is inquired, the previously displayed chart will be closed automatically. The user could choose desired power data classification to view the corresponding Realtime Chart. The chart refreshes every 5 seconds.

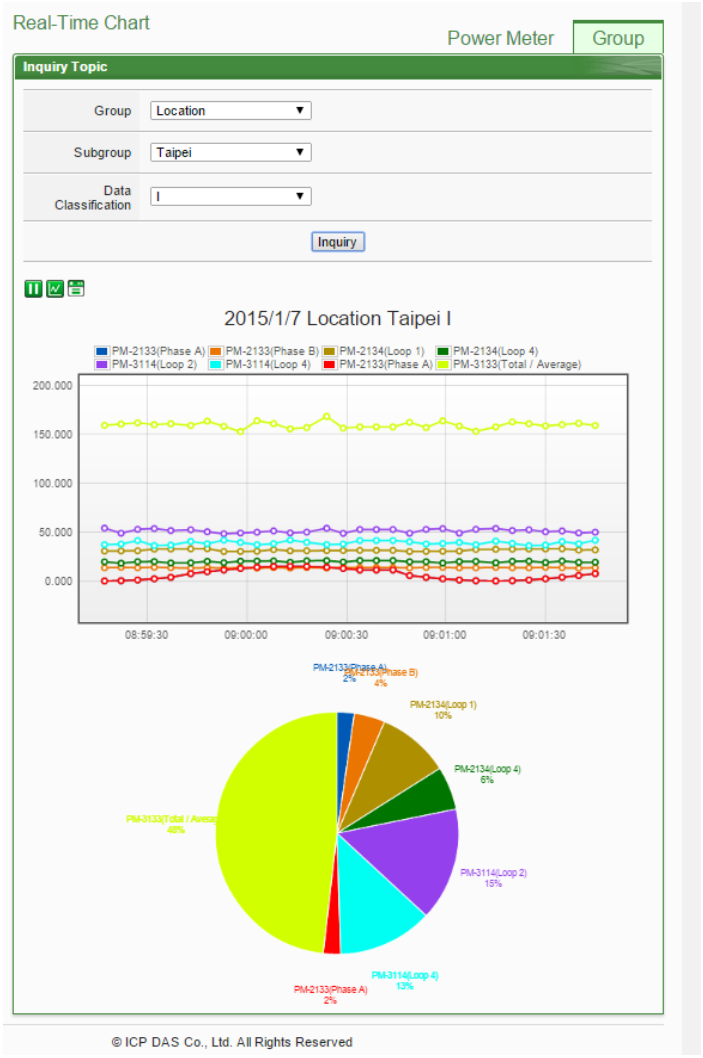


Figure5-14 : Realtime Chart (Group Mode)

There are three function icons on the upper area of the Power Meter Realtime Chart:

- The icon allows to pause the update of the chart, only the data within the 25 minutes will be displayed. The user could click and drag on the chart and move forward or backward to show desired time zone. Click to resume the update of the chart. To view the data on a specific marker, move the mouse over the marker to display the data value.
- icon allows to hide the markers on the chart; click on button to show the markers on the chart.
- icon will show the connection status of the power meters of the subgroup, the graphic indicators are shown as follow:

  : Online : Offline : Connecting

5.4 Historical Chart

Historical Chart allows display of the value and chart of power data in historical trend. Select the power meter from the dropdown list of the Power Meter List, choose the classification from the dropdown list of the Data Classification and then specify the date from the dropdown list of the Date. The interface is shown as below:

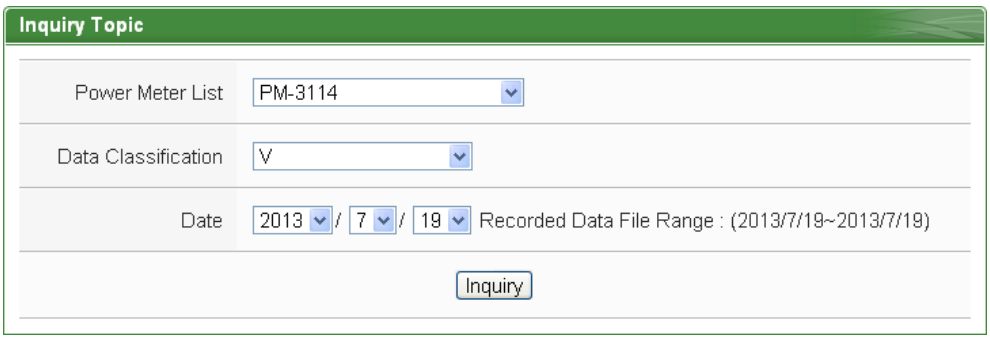


Figure5-15 : Historical Chart Inquiry

- Power Meter List

  All power meter connected to the PMC-5151 will be list on the dropdown list of the Power Meter List, if no power meter is connected, the inquiry operation will not be able to perform.

- Data Classification

  Data Classification allows to inquire various power data options, including: V(Voltage), I(Current), kW(Real Power), kvar (Reactive Power), kVA (Apparent Power), PF (Power Factor), kWh, kvarh, kVAh, Daily Accumulated Electricity, and Actual Demand.

- Date

  The dates that are available for power data retrieval will be displayed. Please note, if no log file is available, the inquiry operation will not be performed.

Click on “Inquiry” to display the power data historical statistic chart (Figure 5-17) and table (Figure 5-18) of the selected date range. If the selected date does not contain the file or exceeds the date of the file storage range, a message “No file exists” will be displayed. The Historical Data Chart and Historical Data Table are shown as below:

- Historical Data Chart

  The historical power data of specified classification will be displayed in historical chart. The user could select the range on the below region or drag and move on the chart to adjust the viewing range. Move the mouse cursor close to the marker, the value will be displayed.

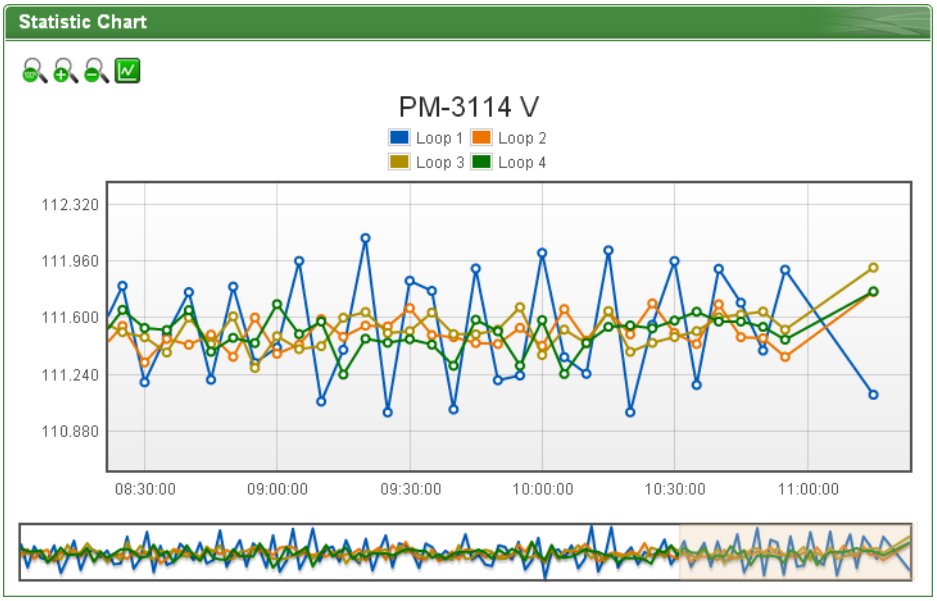


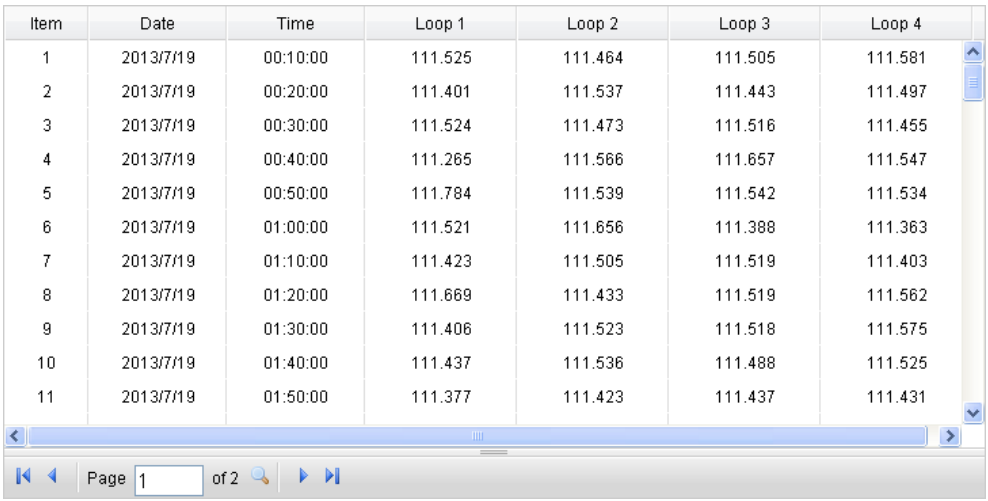
Figure5-16 : Historical Data Chart for power data

On the upper left of the Historical Chart, there are 4 function icons.

- Set the Historical Chart to be default status.
- Zoom in the Y-axis of the Historical Chart
- Zoom out the Y-axis of the Historical Chart
- Hide the markers on the Historical Chart. Show the markers on the Historical Chart

- Historical Data Table

  Historical Data Table will display the requested historical power data; the historical power data of selected classification of each loop (or phase) will be listed.



Item	Date	Time	Loop 1	Loop 2	Loop 3	Loop 4
1	2013/7/19	00:10:00	111.525	111.464	111.505	111.581
2	2013/7/19	00:20:00	111.401	111.537	111.443	111.497
3	2013/7/19	00:30:00	111.524	111.473	111.516	111.455
4	2013/7/19	00:40:00	111.265	111.566	111.657	111.547
5	2013/7/19	00:50:00	111.784	111.539	111.542	111.534
6	2013/7/19	01:00:00	111.521	111.656	111.388	111.363
7	2013/7/19	01:10:00	111.423	111.505	111.519	111.403
8	2013/7/19	01:20:00	111.669	111.433	111.519	111.562
9	2013/7/19	01:30:00	111.406	111.523	111.518	111.575
10	2013/7/19	01:40:00	111.437	111.536	111.488	111.525
11	2013/7/19	01:50:00	111.377	111.423	111.437	111.431

Figure5-17 : Historical Data Table for power data

On the lower left of the Historical Data Table, there are 5 function icons.

- Go to the first page.
- Go to previous page.
- Go to specific page.
- Go to next page.
- Go to last page.

5.5 Historical Data Report

The Historical Data Report allows display of the power data report of desired power meter; specify the power meter, power classification and date range to inquire the data, shown as below:

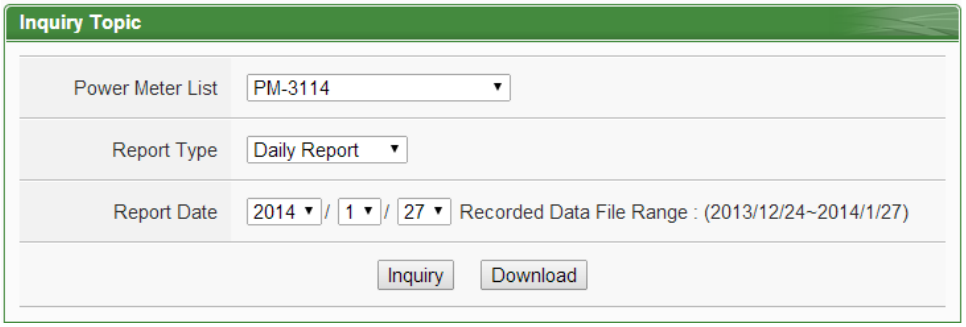


Figure5-18 : Historical Data Report inquiry

- Power Meter List

  All power meter connected to the PMC-5151 will be listed on the

dropdown list of the Power Meter List, if no power meter is connected, the inquiry operation will not be able to perform.

- Report Type
  Allow to inquire Daily Report or Monthly Report options.
- Report Date
  The dates that are available for data retrieval will be displayed.
  Please note: if no log file is available, the inquiry operation will not be performed.

Click on “Inquiry” or ”Download” to display/download the Historical Data Report of the selected date range. If the selected date does not contain the file or exceeds the date of the file storage range, a message “No file exists” will be displayed. For the number of loops of power meters are different, the data report will be in different format, please refer to Figure 5-20 for the Daily Report of 3-phase power meter and Figure 5-21 for the Daily Report of single phase power meter.

PM-2133 2013/04/15 Daily Report

Time	Max. Demand(kW)	kWh	PF(%)	I_a(A)	I_b(A)	I_c(A)	V_a(V)	V_b(V)	V_c(V)	kVA Tot.(kW)	kvar Tot.(kW)
00	3.429	2.835	89.0	9.283	8.781	8.523	224.429	224.006	225.050	3.156	-1.102
01	3.775	3.004	90.6	9.500	9.039	8.743	224.910	224.502	225.498	3.279	-0.975
02	4.484	3.034	89.1	9.724	9.251	9.016	224.016	223.666	224.656	3.340	-1.054
03	4.040	3.214	92.2	10.019	9.579	9.321	224.116	223.789	224.747	3.465	-0.921
04	4.351	2.764	85.4	9.125	8.686	8.345	224.284	223.963	224.935	3.094	-1.108
05	3.939	2.946	88.1	9.183	8.767	8.431	224.307	223.989	224.964	3.221	-0.780
06	4.191	3.195	92.3	9.785	9.381	9.090	224.029	223.706	224.687	3.416	-0.840
07	4.595	3.354	93.0	10.101	9.689	9.383	222.777	222.476	223.442	3.544	-0.720
08	3.826	3.741	99.8	10.293	9.985	9.694	221.961	221.888	222.791	3.761	-0.163
09	4.353	4.141	100.0	11.208	10.935	10.725	222.727	222.797	223.613	4.143	-0.093
10	4.486	4.296	100.0	11.603	11.327	11.127	222.359	222.413	223.230	4.287	-0.071
11	4.407	4.273	100.0	11.627	11.365	11.144	222.136	222.205	222.975	4.293	-0.066
12	4.584	4.505	100.0	12.210	11.896	11.542	223.254	223.028	223.907	4.507	-0.044
13	5.278	5.051	100.0	13.794	13.454	13.360	219.214	219.237	220.022	5.053	0.022
14	5.316	5.211	100.0	14.306	13.854	13.893	219.212	219.278	220.039	5.234	0.027
15	5.255	5.198	100.0	14.091	13.734	13.702	220.170	220.290	221.001	5.190	0.029
16	5.381	5.270	100.0	14.206	13.981	13.845	220.339	220.472	221.191	5.257	0.047
17	5.323	5.270	100.0	14.172	13.994	13.679	221.754	221.819	222.529	5.265	0.055
18	5.090	3.943	100.0	10.749	10.668	10.245	220.483	220.677	221.269	3.951	-0.118
19	3.902	3.860	99.9	10.552	10.429	10.038	220.689	220.959	221.548	3.872	-0.142
20	3.833	3.602	96.8	10.344	10.181	9.895	221.677	221.872	222.562	3.711	-0.502
21	3.540	3.241	92.1	10.342	10.071	9.884	221.711	221.750	222.578	3.548	-1.021
22	3.555	3.293	92.5	10.224	9.940	9.754	222.108	222.144	223.018	3.529	-0.970
23	4.248	3.263	90.8	10.082	9.731	9.541	222.724	222.705	223.584	3.493	-0.927

Daily Maximum Demand: 5.381 kW Time: 2013/04/15 16:41:59 Total: 92.504 kWh

Figure5-19 : Daily Report for PM-3133

PM-3114 Loop1 2013/07/19 Daily Report

Time	Max. Demand(kW)	kWh	PF(%)	I(A)	V(V)	kVA Tot.(kW)	kvar Tot.(kW)
00	0.804	0.792	95.2	7.500	111.503	0.836	0.253
01	0.798	0.792	94.8	7.517	111.497	0.838	0.262
02	0.800	0.782	93.8	7.480	111.423	0.833	0.282
03	0.803	0.791	94.5	7.513	111.492	0.838	0.265
04	1.512	0.034	95.7	8.287	111.594	0.927	0.279
05	0.903	0.794	95.3	7.482	111.567	0.834	0.251
06	0.805	0.790	94.6	7.498	111.480	0.836	0.265
07	0.802	0.791	94.8	7.492	111.534	0.836	0.260
08	0.797	0.791	94.5	7.502	111.474	0.837	0.265
09	0.804	0.785	94.2	7.495	111.441	0.835	0.276
10	0.805	0.794	94.9	7.509	111.445	0.837	0.257

Daily Maximum Demand: 1.512 kW Time: 2013/07/19 04:57:59 Total: 7.936 kWh

Figure5-20 : Daily Report for PM-3114

5.6 Historical Electricity Analysis

Historical Electricity Analysis can be done in 3 ways: Electricity Usage Analysis of Trend, Electricity Usage Analysis of Time and Electricity Usage Analysis of Proportion. The user can query electricity analysis for specific date by selecting Chart Type, Data Classification, Date and Loop(s)/Phase(s); the following section will provide more detailed information:

5.6.1 Electricity Usage Analysis of Trend

The users could specify the data classification and the time range under this section, and then select the loop(s)/phase(s) to be inquired; the corresponding Electricity Usage Analysis will be displayed in Trend chart format.

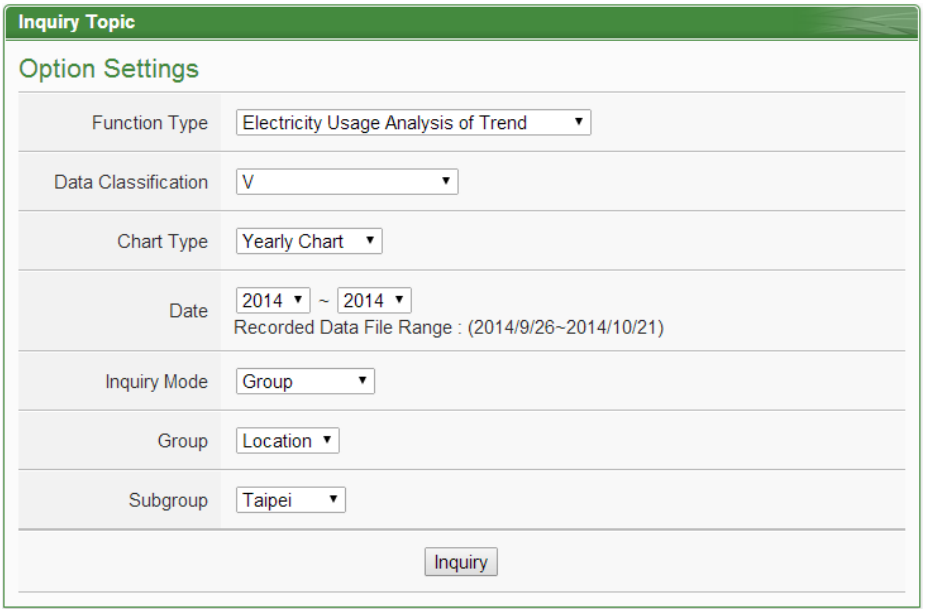


Figure5-21 : Electricity Usage Analysis of Trend

- Function Type: The user can select one of the following three options for electricity analysis: Electricity Usage Analysis of Trend, Electricity Usage Analysis of Time and Electricity Usage Analysis of Proportion.
- Inquiry Mode：The user can select one of the following two options for inquirying: group mode and user-defined mode.
  - Group：

    In group mode, the user can select group and subgroup to inquire the electricity usage analysis of loops/phases of the power meters in the format of trend chart. If no group is pre-set, the user will not be able to perform inquiry operation.

Figure5-22 : Inquiry by Group Mode

- User-defined：

  In user-defined mode, all power meters connected to the PMC-5151 will be listed. If no power meter is connected, the user will not be able to perform inquiry operation. The minimum loop/phase to be queried is 1 loop/phase.

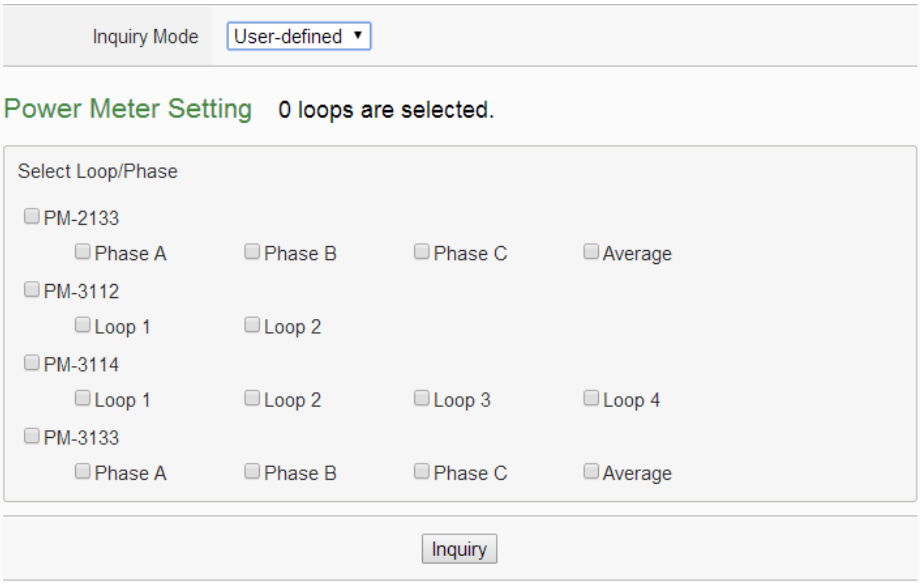


Figure5-23 : Inquiry by User-defined Mode

Click on “Inquiry” button to display the trend of Electricity Usage Analysis for the specified date range. If the selected date does not contain the file or exceeds the date of the file storage range, a message “No file exists” will be displayed. The trend of Electricity Usage Analysis data of specified classification will be displayed in historical chart. The user could select the range on the below region or drag and move on the chart to adjust the viewing range. Move the mouse cursor close to the marker, the value will be displayed.

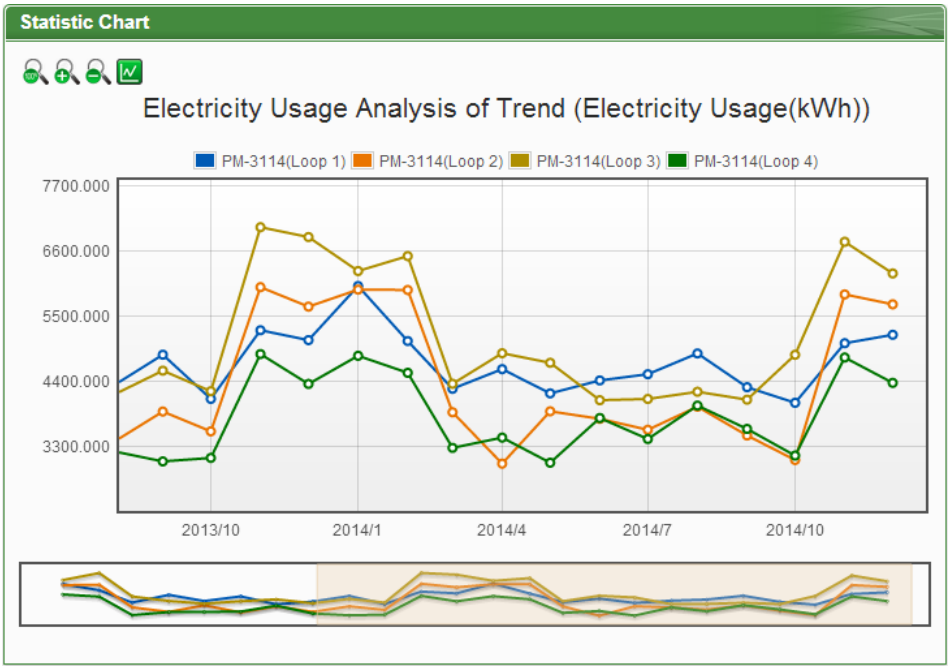


Figure5-24 : PM-3114 Electricity Usage Analysis Trend Chart

On the upper left of the Electricity Usage Analysis of Trend Chart, there are 4 function icons.

- Set the Electricity Usage Analysis of Trend Chart to be default status.
- Zoom in the Y-axis of the Electricity Usage Analysis of Trend Chart.
- Zoom out the Y-axis of the Electricity Usage Analysis of Trend Chart.
- Hide the markers on the Electricity Usage Analysis of Trend Chart. Show the markers on the Electricity Usage Analysis of Trend Chart.

5.6.2 Electricity Usage Analysis of Time

The users could specify the data classification and the time range under this section, and then select the loop(s)/phase(s) to be inquired; the corresponding Electricity Usage Analysis of Time will be displayed in histogram chart to show the annual, quarterly or monthly electricity usage comparison for each year.

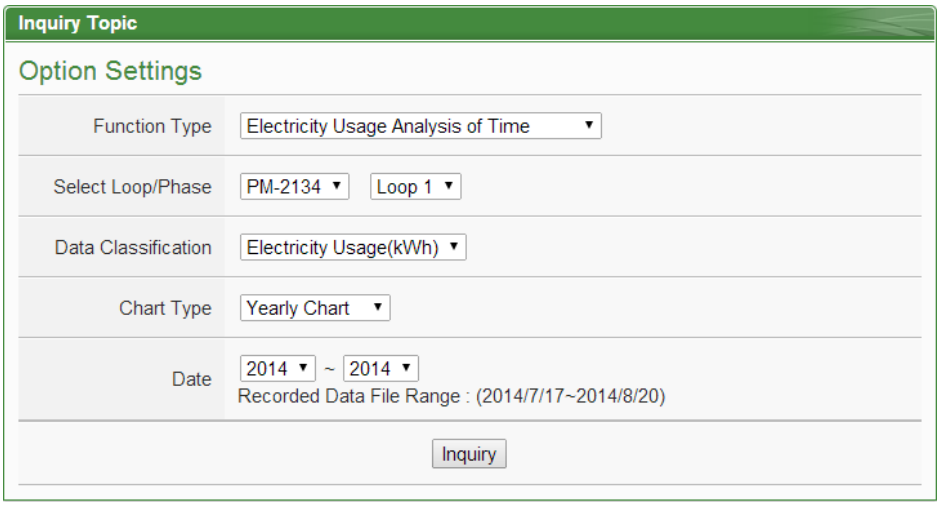


Figure5-25 : Electricity Usage Analysis of Time

- Function Type: The user can select one of the following three options for electricity analysis: Electricity Usage Analysis of Trend, Electricity Usage Analysis of Time and Electricity Usage Analysis of Proportion.
- Select Loop/Phase: All power meters connected to the PMC-5151 will be listed. If no power meter is connected, the user couldn't perform inquiry operation.
- Data Classification: includes V (voltage), I (current), PF (power factor), Electricity Usage (KWh), and Maximum Demand.
- Chart Type: Provides Yearly Chart, Quarterly Chart and Monthly Chart.
- Date: Select the date range to be queried (the system will provide the date range can be queried)

Click on "Inquiry" button to display the Electricity Usage Analysis of Time for the specified date range. If the selected date does not contain the file or exceeds the date of the file storage range, a message "No file exists" will be displayed. The Electricity Usage Analysis of Time will be displayed in the lower region in histogram chart. Move the mouse cursor close to the histogram chart, the value will be displayed.

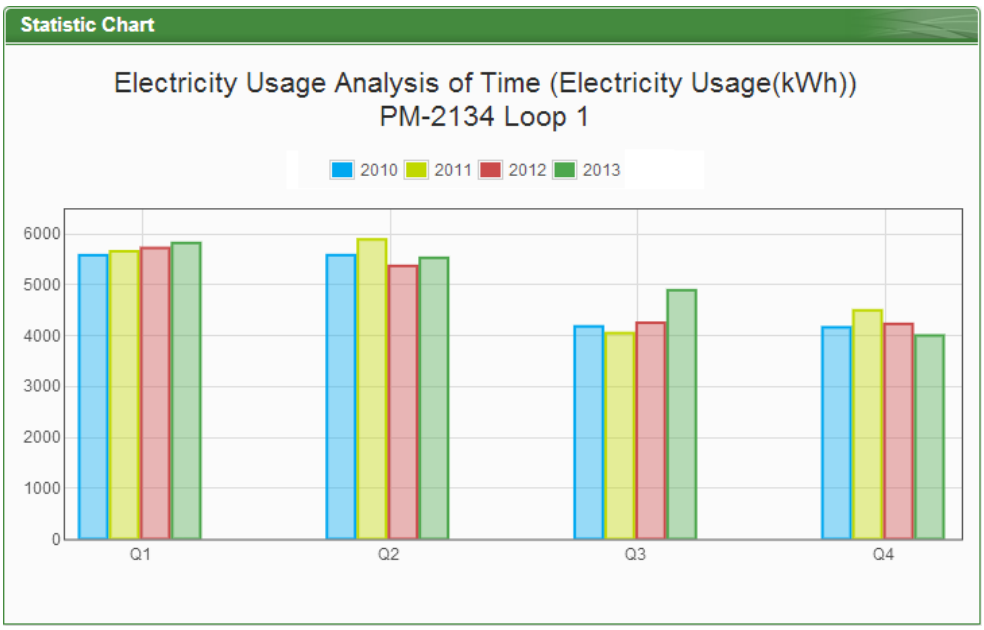


Figure5-26 : Time Histogram Chart for PM-3114 Loop 1

5.6.3 Electricity Usage Analysis of Proportion

The users could specify the data classification and the time range under this section, and then select the loop(s)/phase(s) to be inquired; the corresponding Electricity Usage Analysis of Proportion will be displayed in category pie chart to show the Electricity Usage Proportion of the loops/phases.

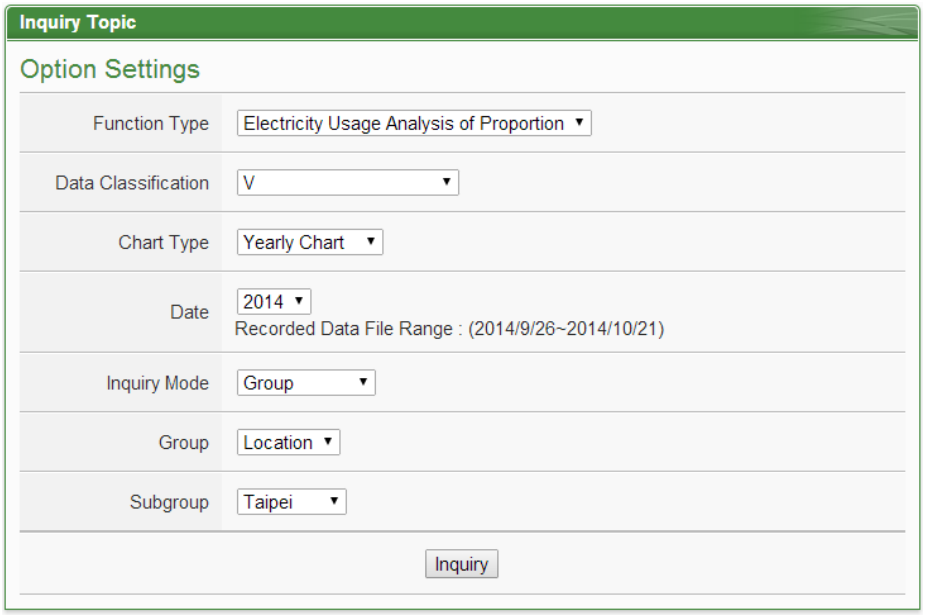


Figure5-27 : Electricity Usage Analysis of Proportion

- Function Type: The user can select one of the following three options for electricity analysis: Electricity Usage Analysis of Trend, Electricity Usage Analysis of Time and Electricity Usage Analysis of Proportion.
- Data Classification: includes V (voltage), I (current), PF (power factor), Electricity Usage (KWh), and Maximum Demand.
- Chart Type: Provides Yearly Chart, Monthly Chart and Daily Chart.
- Date: Select the date range to be queried (the system will provide the date range can be queried).
- Inquiry Mode：The user can select one of the following two options for inquirying: group mode and user-defined mode.
  - Group：

    In group mode, the user can select group and subgroup to inquiry the electricity usage analysis of loops/phases of the power meters in the format of proportion chart. If no group is pre-set, the user will not be able to perform inquiry operation.

Figure5-28 : Inquiry by Group Mode

- User-defined：

  In user-defined mode, all power meters connected to the PMC-5151 will be listed. If no power meter is connected, the user will not be able to perform inquiry operation. The minimum loop/phase to be queried is 1 loop/phase.

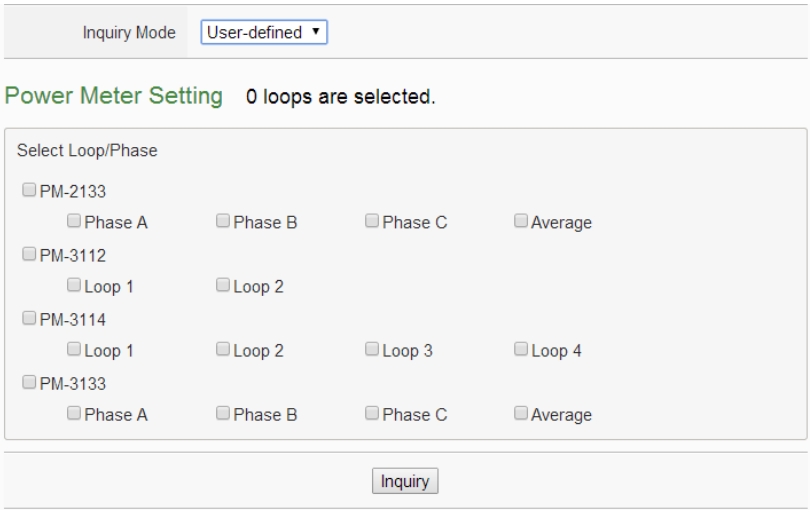


Figure5-29 : Inquiry by User-defined Mode

Click on “Inquiry” button to display the Electricity Usage Analysis of Proportion for the specified date range. If the selected date does not contain the file or exceeds the date of the file storage range, a message “No file exists” will be displayed. The Electricity Usage Analysis of Proportion will be displayed as category pie chart in the lower region. Move the mouse cursor close to the category pie chart, the value will be displayed. The electricity usage information will be listed as table below. The maximum and minimum value of the loop/phase will be listed on the table. If the Data Classification of the inquired data is Electricity Usage (KWh), the statistic information of total Electricity Usage will also be listed on the table.

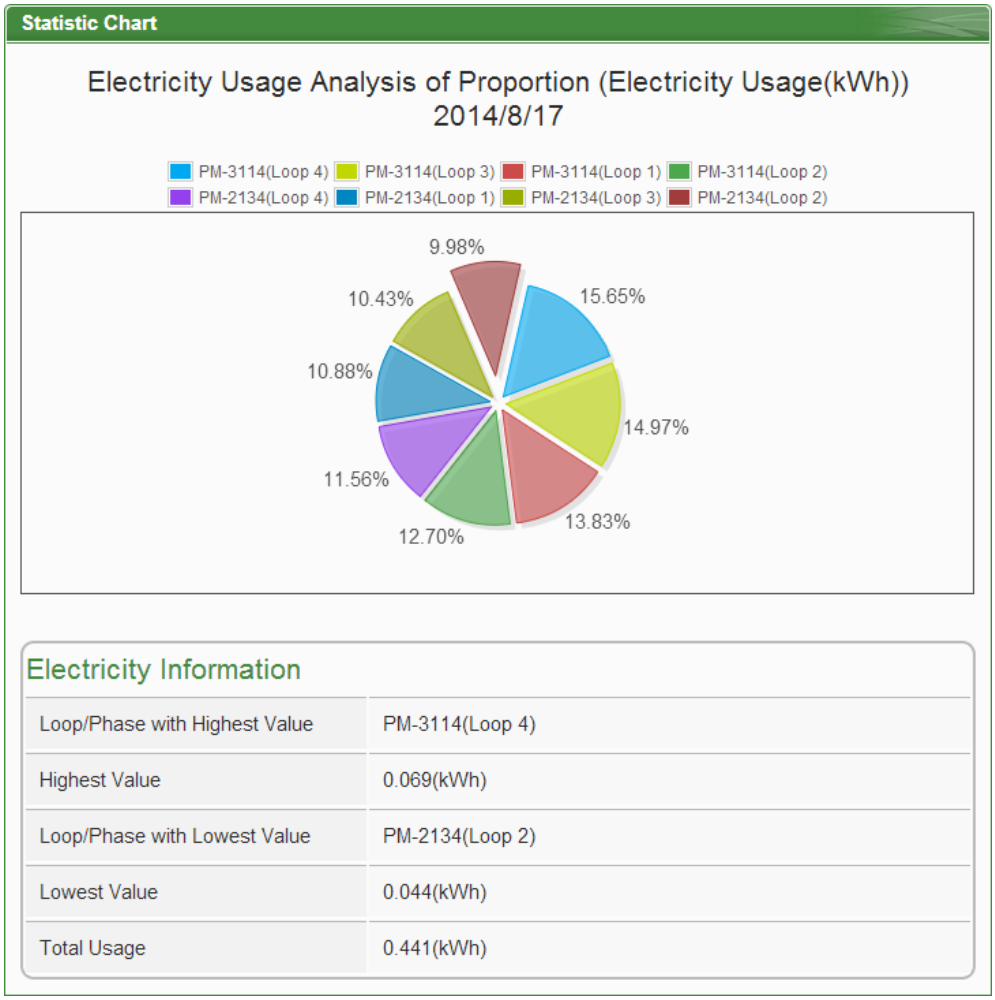


Figure5-30 : Electricity Usage Analysis of Proportion Chart

5.7 PUE Information

Power Usage Effectiveness(PUE) information can be displayed in two modes(Real-Time and History), users can change the viewing mode according to the requirement；more detailed information is as below:

5.7.1 Real-Time

"Real-Time" overview mode allows display of the mutiple PUE values which are calculated by "Total Facility Energy" and "IT Equipment Energy" preset by users. The page refreshes every 20 seconds, the user could also click "Refresh" button to refresh the data immediately.

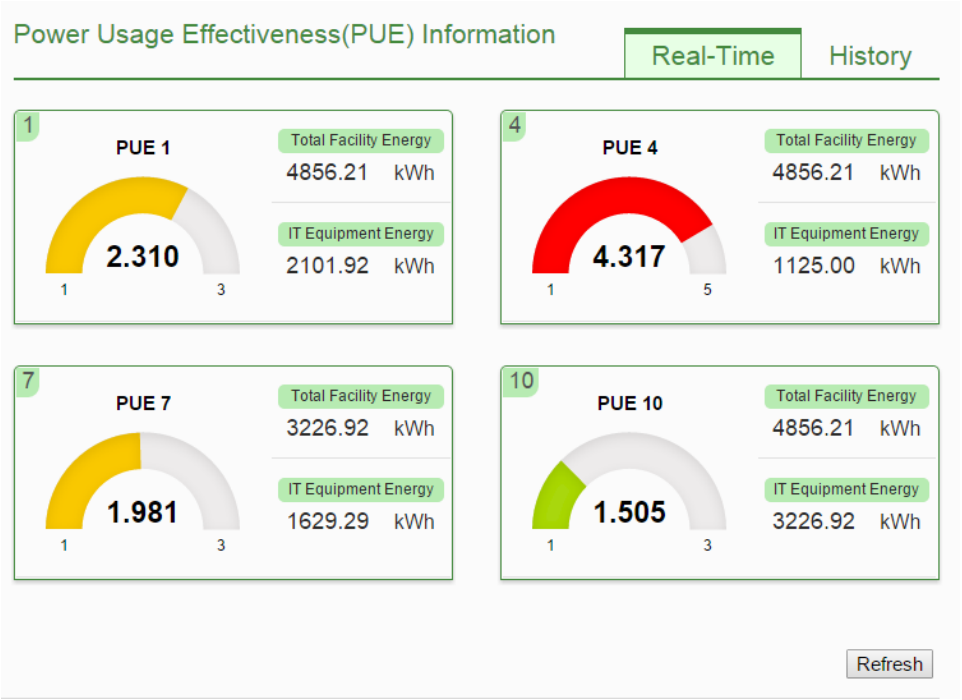


Figure5-31 : PUE information - Realtime

5.7.2 History

"History" overview mode allows display of the PUE data in historical trend. Select the PUE option from the dropdown list of the PUE List, choose the classification from the dropdown list of the Chart Type and then specify the date from the dropdown list of the Date. The interface is shown as below:

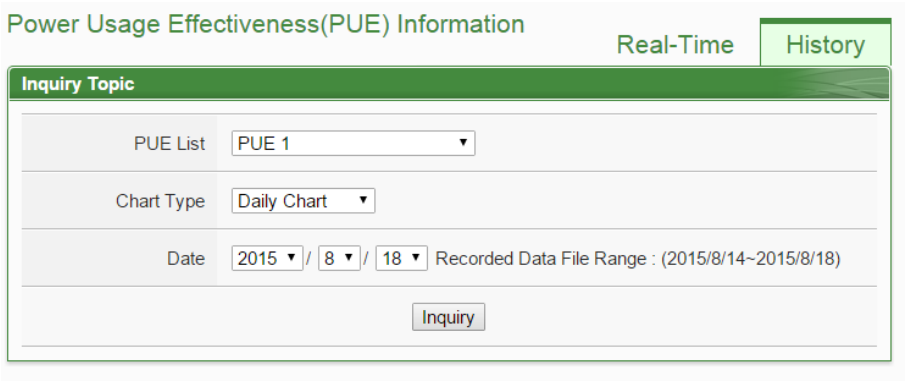


Figure5-32 : PUE information - History(1)

- PUE List：All PUE options which are preset by users will be listed on the dropdown list of the PUE List, if no PUE option is preset, the inquiry operation will not be able to perform.
- Chart Type：Provides Daily Chart and Monthly Chart.
- Date：The dates which are available for PUE data retrieval will be displayed. Please note, if no log file is available, the inquiry operation will not be performed.

Click on “Inquiry” to display the PUE data historical statistic chart (Figure 5-34) of the selected date range. If the selected date does not contain the file or exceeds the date of the file storage range, a message “No file exists” will be displayed.

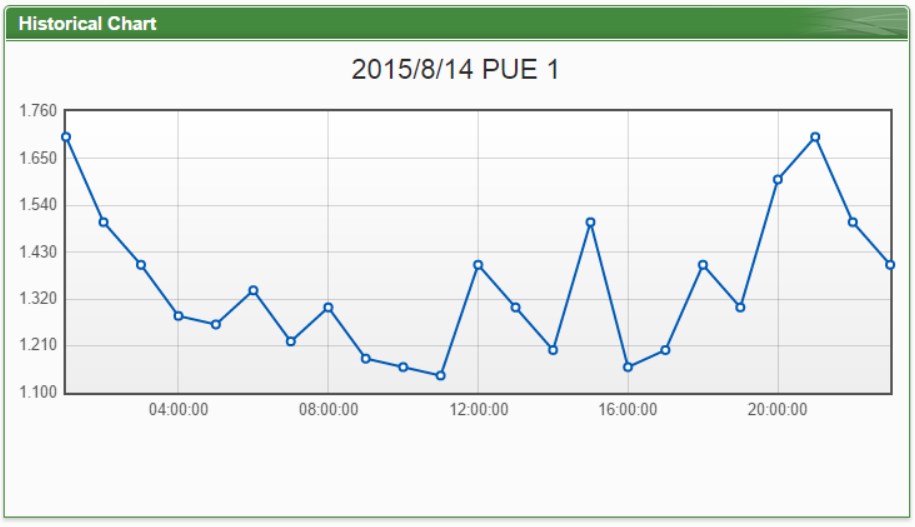


Figure5-33 : PUE information - History(2)

5.8 I/O Information

The I/O Information page will display the real-time values of the Internal Registers of the PMC-5151and the real-time I/O channels values of all I/O modules (including XW Board, M-7000 Modules, Modbus RTU Modules and Modbus TCP modules) that are connected to the PMC-5151. If login as the Administrator, it allows to modify the values of Internal Registers or output values of the DO/AO channels (Figure 5-35). If login as a general user, they are allowed to view the values of Internal Registers and the I/O channels (Figure 5-36) only.

Figure5-34 : I/O Information(login as Administrator)

Figure5-35 : I/O Information(login as General User)

The graphic indicator on the right side of the I/O modules will reveal the connection status of the module, the graphic indicators are as follow:
: Online : Offline : Connecting

5.9 Event Log

The Event Log page allows to view the list of system event logger information when login as the Administrator.

Time	Type	Content	Result
2013/07/19 15:59:24	Modbus RTU	Meter read failed (PM-2133 ID:3 address:4352~4423)	Failed
2013/07/19 15:59:15	Rules Setting	Rules file download succeeded	OK
2013/07/19 15:58:21	Modbus RTU	Meter read failed (PM-2133 ID:3 address:4352~4423)	Failed
2013/07/19 15:58:12	Rules Setting	Rules file download succeeded	OK
2013/07/19 15:55:57	Modbus RTU	Meter read failed (PM-2133 ID:3 address:4352~4423)	Failed
2013/07/19 15:55:48	Rules Setting	Rules file download succeeded	OK
2013/07/19 15:47:50	Modbus RTU	Meter read failed (PM-2133 ID:3 address:4352~4423)	Failed
2013/07/19 15:47:42	Rules Setting	Rules file download succeeded	OK
2013/07/19 15:11:59	Modbus RTU	Meter read failed (PM-2133 ID:3 address:4352~4423)	Failed
2013/07/19 15:11:50	Rules Setting	Rules file download succeeded	OK
2013/07/19 14:45:21	Modbus RTU	Meter read failed (PM-2133 ID:3 address:4352~4423)	Failed
2013/07/19 14:45:19	Firmware	Firmware upgrade succeeded [1.0.0 to 1.0.0]	OK
2013/07/19 14:41:02	Firmware	Download [[20130705]PMC-5151.zip] succeeded	OK
2013/07/19 14:19:20	Modbus RTU	Meter read failed (PM-2133 ID:3 address:4352~4423)	Failed
2013/07/19 14:19:17	Firmware	Firmware upgrade succeeded [1.0.0(Demo) to 1.0.0]	OK
2013/07/19 14:15:20	Firmware	Download [20130710-PMC-5151.hex] succeeded	OK
2013/07/19 14:12:27	Rules Setting	Rules file download succeeded	OK
2013/07/19 14:06:59	Rules Setting	Rules file download succeeded	OK
2013/07/19 13:59:55	Firmware	Firmware upgrade succeeded [1.0.0 to 1.0.0(Demo)]	OK
2013/07/19 13:59:08	Modbus RTU	Meter read succeeded(PM-3112 ID:4 address:4352~4387)	OK

Figure5-36 : Event Log information display

The Event Log record including the following information:

- The PMC-5151 failed to read data of the power meter(s).
- Change the network settings on the PMC-5151.
- Save settings to the PMC-5151.
- Change the system time setting.
- Reset accumulated power data of the power meter to 0.
- Transfer Data Logger files to FTP server succeeded or failed.
- When performing firmware upgrade, record the transfer of the firmware file to the PMC-5151 is succeeded or failed.
- The upgrade of the firmware is succeeded or failed.

5.10 HMI User-Defiend HMI

User-Defined HMI will not be shown on the main page by default. When you login as the administrator, you can set the Flash HMI project as the default system page, and then the Flash HMI page will be shown on the main page.

(For more detailed information about HMI project edition and settings, please refer to Flash HMI Tools Quick Start.)

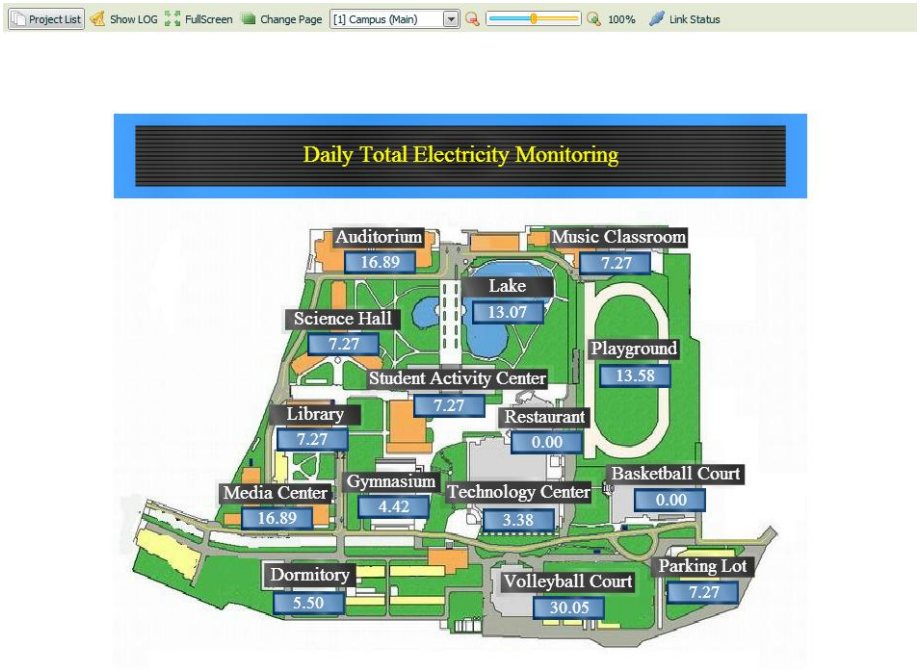


Figure5-37 : User-Defiend HMI page

5.11 Polling Time Information

Users can check the polling time of each modules and power meters which are connected with PMC-5151 currently. The "Polling" Time Infomation Page" is as below:

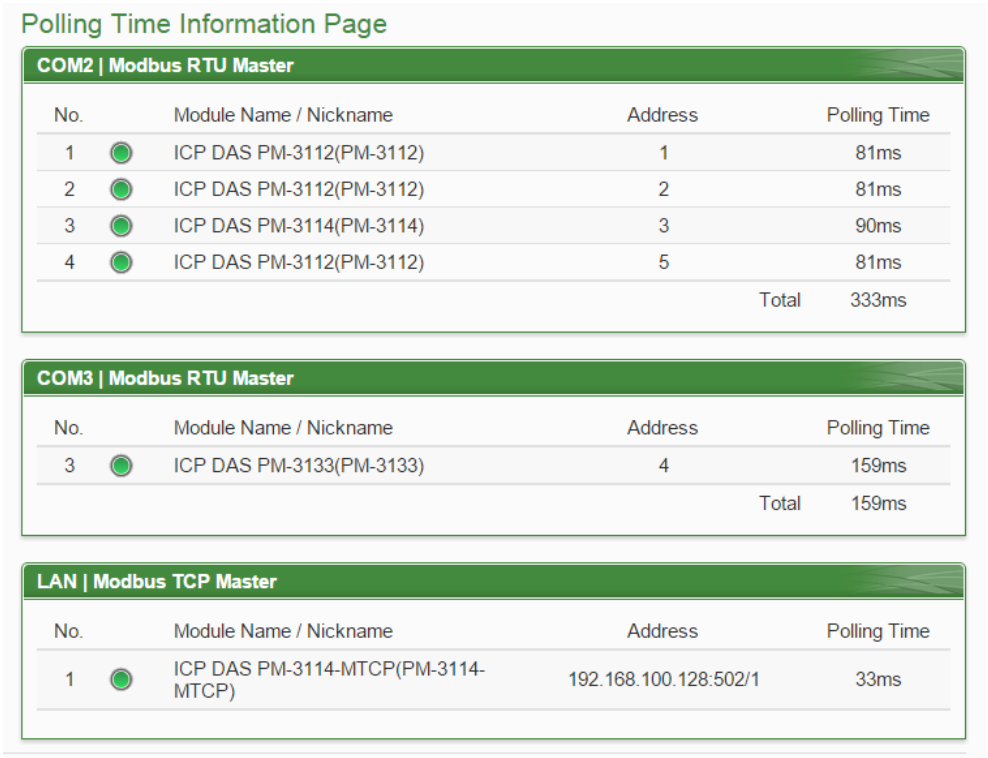

Polling Time Information Page
COM2 | Modbus RTU Master
No. Module Name / Nickname Address Polling Time
1 ICP DAS PM-3112(PM-3112) 1 81ms
2 ICP DAS PM-3112(PM-3112) 2 81ms
3 ICP DAS PM-3114(PM-3114) 3 90ms
4 ICP DAS PM-3112(PM-3112) 5 81ms
Total 333ms
COM3 | Modbus RTU Master
No. Module Name / Nickname Address Polling Time
3 ICP DAS PM-3133(PM-3133) 4 159ms
Total 159ms
LAN | Modbus TCP Master
No. Module Name / Nickname Address Polling Time
1 ICP DAS PM-3114-MTCP(PM-3114-MTCP) 192.168.100.128:502/1 33ms

Figure5-38 : Polling Time Information

The graphic indicator on the right side of the No. will reveal the connection status of the module, the graphic indicators are as follow:

: Online : Offline : Connecting

5.12 Modbus Table Information

The user can query and print the detailed modbus address information of the modules which are connected to PMC-5151. Please refer to Appendix I for more detailed Modbus address description.

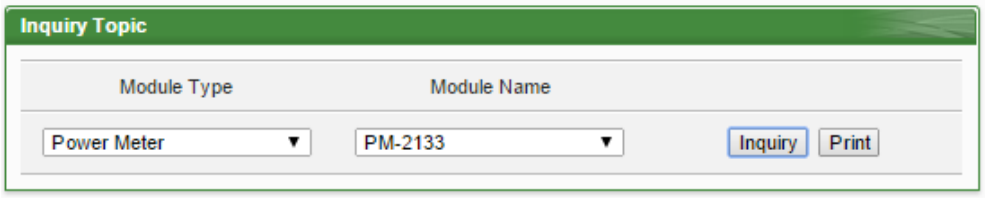


Figure5-39 : The User Interface of Modbus Table Information

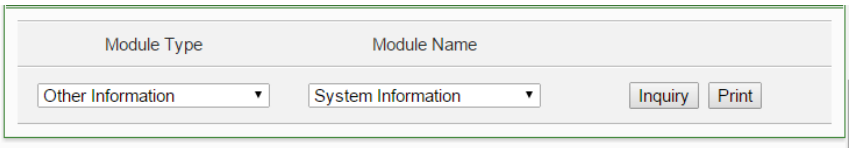
- Module Type

  "Module Type" includes 4 options : Power Meter, I/O Module, XW-Board, and Other Information

- Module Name

  According to the selected "Module Type" option, the corresponding module name or information of "Module Name" will be listed.

Click on "Inquiry" to display the Modbus table information of the selected module (Figure 5-39). The users can click on the "Print" button to print this Modbus address table.



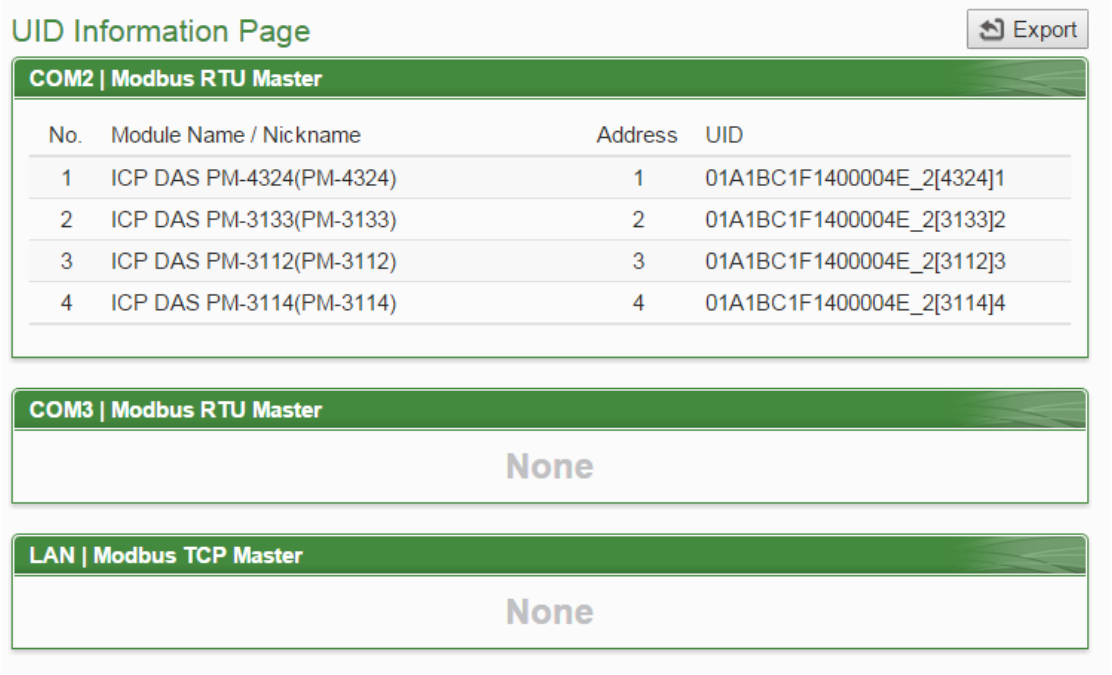
PM-2133					
No.	Port	Address	Module Name	PT Ratio1	CT Ratio1
1	COM2	1	PM-2133	1	1

Input Register, Unit : Register(16 Bits)				
Parameter Name	Modbus Address	Length	Data Type	Range
Phase A				
V	30300	2	Float	Floating Point
I	30302	2	Float	Floating Point
kW	30304	2	Float	Floating Point
kvar	30306	2	Float	Floating Point
kVA	30308	2	Float	Floating Point
PF	30310	2	Float	Floating Point
kWh	30312	2	Float	Floating Point
kvarh	30314	2	Float	Floating Point
kVAh	30316	2	Float	Floating Point
Phase B				
V	30318	2	Float	Floating Point
I	30320	2	Float	Floating Point
kW	30322	2	Float	Floating Point
kvar	30324	2	Float	Floating Point
kVA	30326	2	Float	Floating Point

Figure5-40 : Inquiry result of Modbus Table Information

5.13 UID Information

Users can check the UID information of each power meters which are connected with PMC-5151 currently. The "UID Infomation" page is as below:


UID Information Page
Export
COM2 | Modbus RTU Master
No. Module Name / Nickname Address UID
1 ICP DAS PM-4324(PM-4324) 1 01A1BC1F1400004E_2[4324]1
2 ICP DAS PM-3133(PM-3133) 2 01A1BC1F1400004E_2[3133]2
3 ICP DAS PM-3112(PM-3112) 3 01A1BC1F1400004E_2[3112]3
4 ICP DAS PM-3114(PM-3114) 4 01A1BC1F1400004E_2[3114]4
COM3 | Modbus RTU Master
None
LAN | Modbus TCP Master
None

Users can click "Export" button to export the UID information as CSV file.

6 System Setting

System Setting includes 6 options: Time Setting, Network Setting, SNMP Setting, Security Setting, I/O Interface Setting and Other Setting. When you get into the System Setting page, the system settings information of this PMC-5151 will be displayed, as shown below:

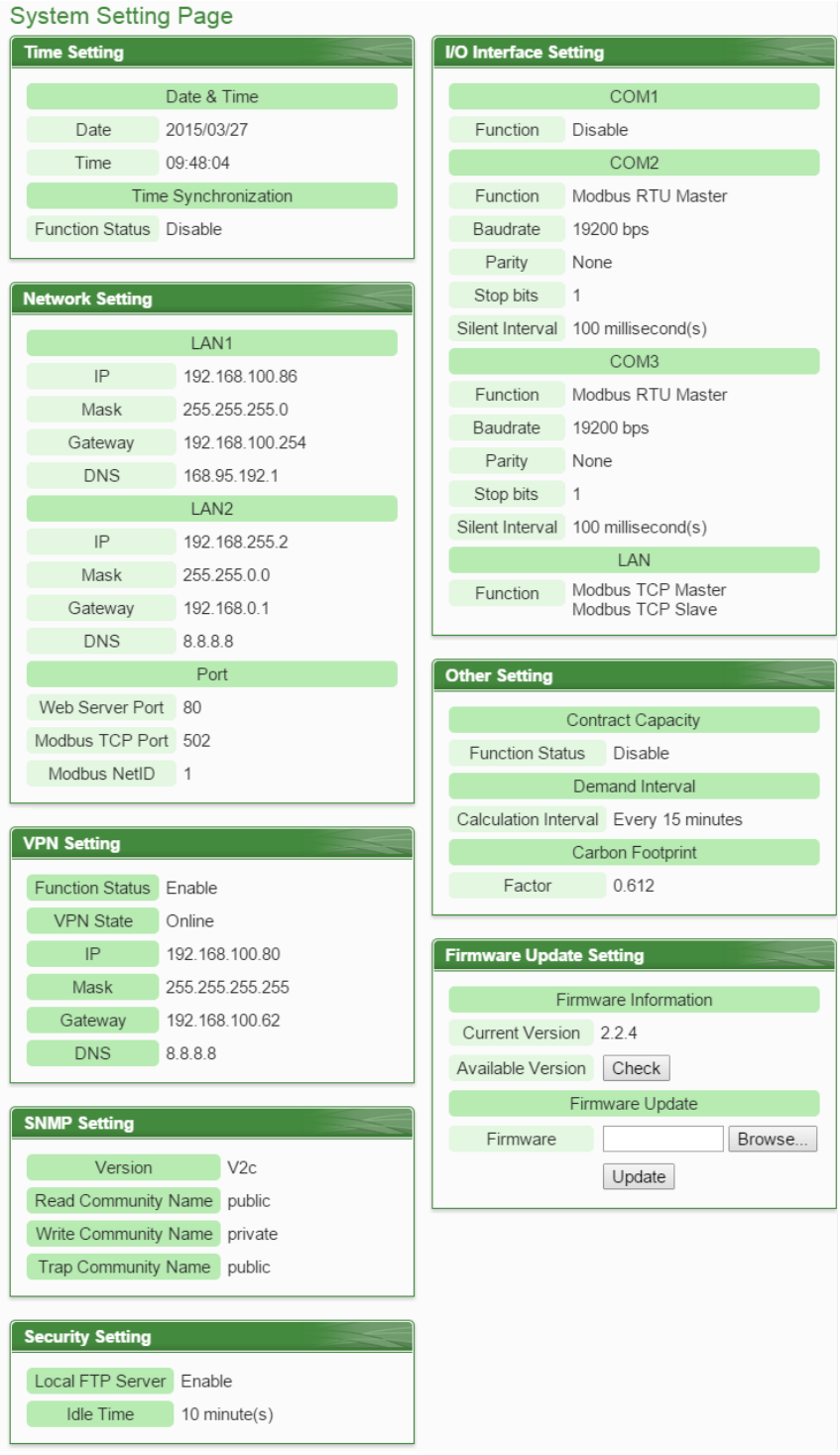


Figure6-1 : System Setting Overview Page

The user could view system setting information of PMC-5151 or perform firmware update on this page. For firmware update operations, please refer to 6.9 Firmware Update.

6.1 Time Setting

On the Time Setting page, it allows to set the time of PMC-5151 and Time Synchronization function. The setting interface is as below:

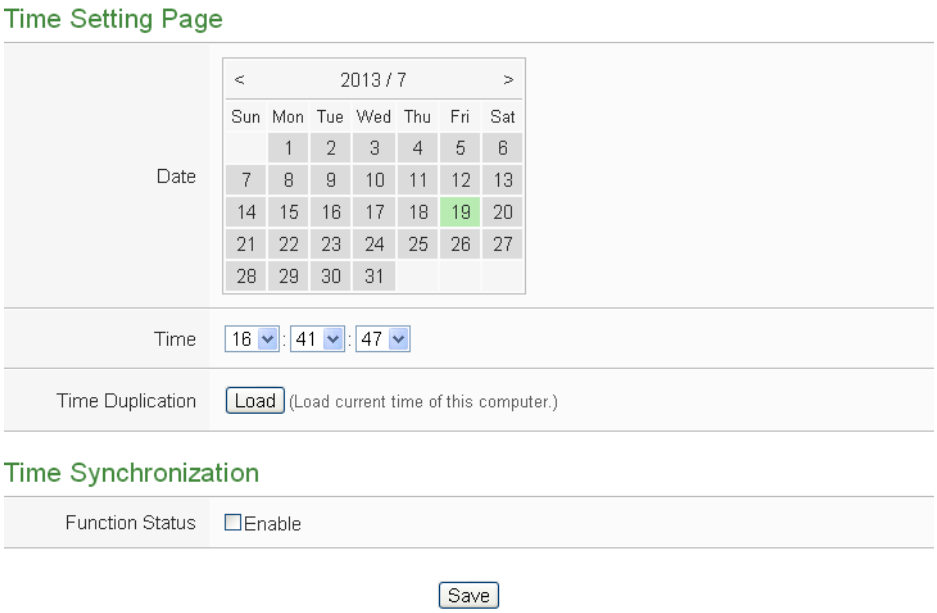


Figure6-2 : Time Setting Page

When get into this page, the system will read and display current time of the PMC-5151. To modify the system time of PMC-5151, set up the date and time on the “Time Setting page section” and then click “save” to complete the settings. The user could click on “Load” in the “Time Duplication” to synchronize the system time of the computer where the browser located and the system time of the PMC-5151. The PMC-5151 also provides SNTP Time Server function that allows to set up Time Synchronization to sync the clock through network. The following figure illustrates the set up interface:

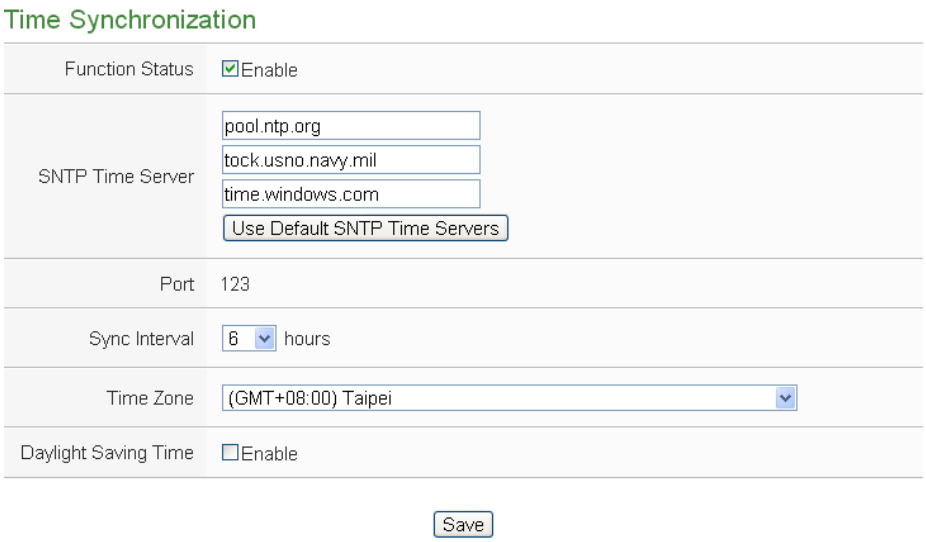


Figure6-3 : Time Synchronization Setting

Follow the steps below to set up Time Synchronization Setting:

i. In the "Function Status" field, check "Enable"to enable the Time Synchronization function.

ii. In the "SNTP Time Server" field, input the IP address or domain name of the SNTP Time Server. There are 3 default SNTP Time Servers, the user could modify the address to use other server. Click "Use Default SNTP Time Servers" to restore the default Time Server settings.

iii. The default Port number setting is "123", currently it is not allowed to be modified.

iv. In the "Sync Interval" field, select the time interval to specify how often will the PMC-5151 automatically connect to SNTP time server for time synchronization through the network. The user could set the time interval to be 6, 12, or 24 hours.

v. In the "Time Zone" field, select the time zone of the PMC-5151's location from the dropdown list.

vi. In the "Daylight Saving Time" field, enable the daylight saving time function if required.

After all settings are completed, click "Save" button to save the changes.

6.2 Network Setting

Network Setting allows making a change to network configuration, web server port or Modbus settings on the PMC-5151. The following figure illustrates the configuration interface:

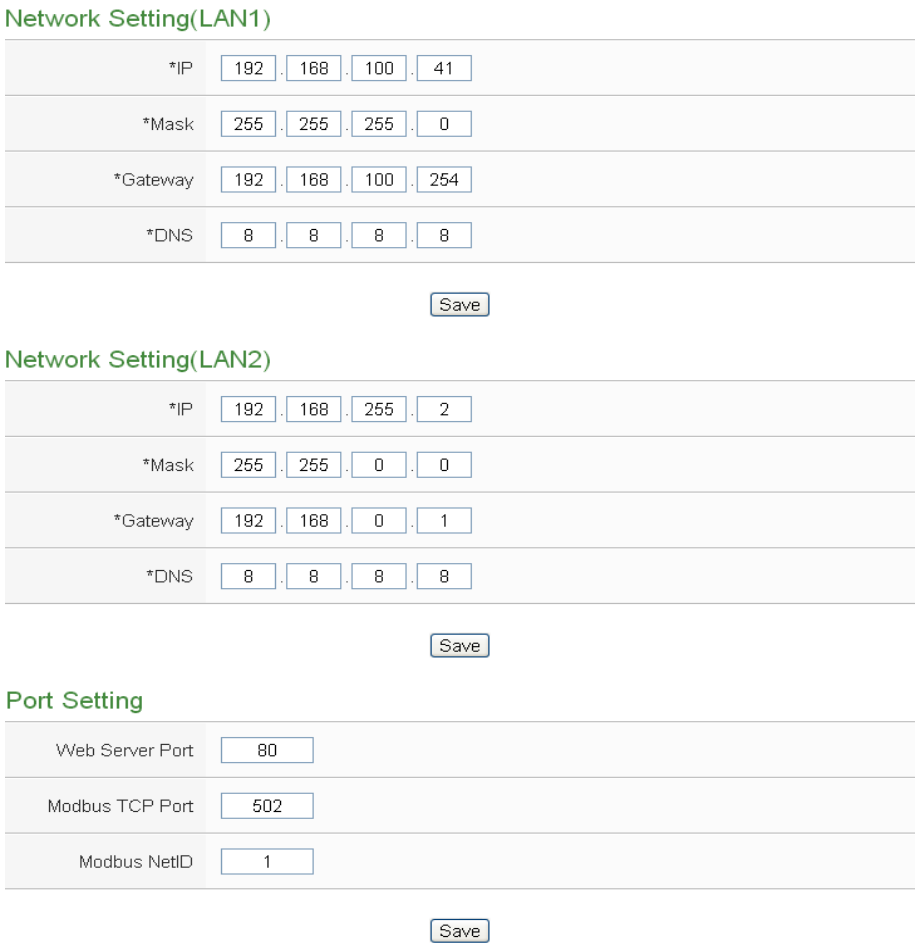

Network Setting(LAN1)
*IP 192 . 168 . 100 . 41
*Mask 255 . 255 . 255 . 0
*Gateway 192 . 168 . 100 . 254
*DNS 8 . 8 . 8 . 8
Save
Network Setting(LAN2)
*IP 192 . 168 . 255 . 2
*Mask 255 . 255 . 0 . 0
*Gateway 192 . 168 . 0 . 1
*DNS 8 . 8 . 8 . 8
Save
Port Setting
Web Server Port 80
Modbus TCP Port 502
Modbus NetID 1
Save

Figure6-4 : Network Setting Page

Each time when the user enters this page, it will read and display current network configuration (LAN1/LAN2) and port settings from the PMC-5151. In the “Network Settings” section, the user can modify IP/Mask/ Gateway/DNS Server IP configuration. After all settings are completed, click “Save” button to save the changes. After the network configuration is completed, the user could login into PMC-5151 webpage via LAN1 or LAN2, and is able to retrieve data via Modbus TCP. In the “Port Setting” section, the user can modify the Web Server Port/ Modbus TCP Port/ Modbus NetID. After all settings are completed, click “Save” button to save the changes.

Please note:

1. PMC-5151 adopts Google DNS server as system default DNS server, the default IP is “8.8.8.8”, the IP can be modified to other DNS server IP if required.
2. If you make any modification to the network configuration, the system will logout automatically and re-connect to the web page automatically based on the new setting.

6.3 VPN Setting

PMC-5151 supports VPN(Virtual Private Network) function to connect with the virtual private network. With this function, it enhances the flexibility of the maintenance and management of the PMC-5151. The setting interface is as below:

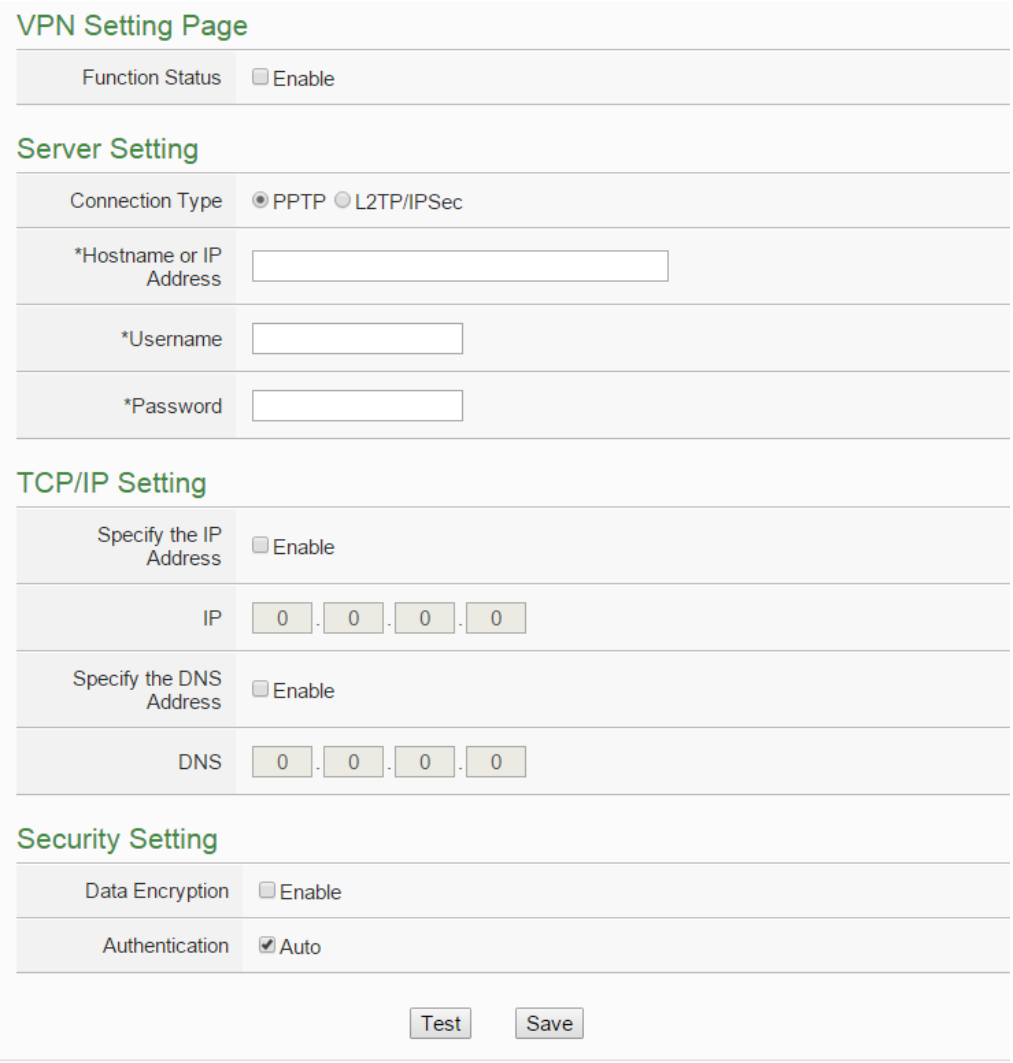


Figure6-5 : Setting interface of VPN function

When setting up the parameters of the VPN connection, please setup correct and suitable settings of the VPN server, TCP/IP and security according to the parameters of the remote VPN server. Please click "Test" or "Save" button to test or save the settings. The description of these two buttons are as below:

- Test" button

  The system will test the VPN connection settings. If the connection is failed, please confirm the settings again.

- "Save" button

  The system will save the VPN connection settings. If the "Function Status" is "Enable", the system will start the VPN connection, and the connection status will be shown on "System Setting Page" as below:

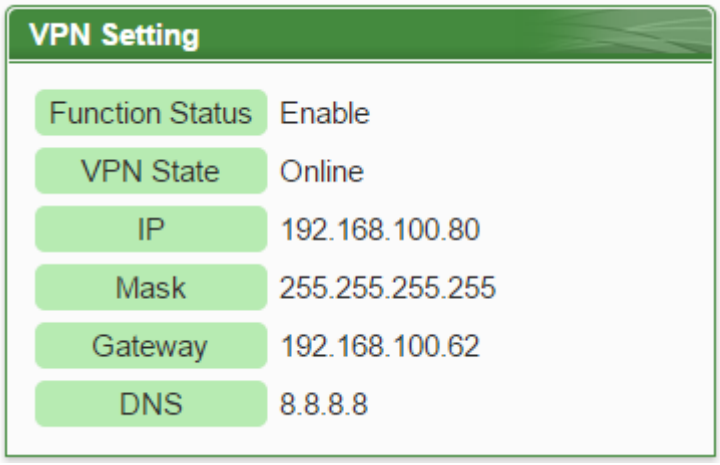


Figure6-6 : Setting interface of VPN function

Please note:

1. When using VPN IP address to login the system, the below functions will be disabled:
   - The network settings of LAN1 and LAN2

     If the user wants to modify the settings of LAN1 or LAN2, please use the IP address of LAN1 or LAN2 to login the system.
   - The testing function of VPN

     If the user wants to test the settings of VPN connection, please use the IP address of LAN1 or LAN2 to login the system.
2. When the user is using the VPN IP address to login the system and save the VPN settings, the system will logout the user and redirect the webpage to the new VPN IP address automatically. If the user is not sure about the new VPN IP address, please use the IP address of LAN1 or LAN2 to login the system and go to the "System Setting Page" to inquiry the VPN settings.

3. When the VPN connection is failed due to security issues, please check if the security settings of the remote VPN servers are matched with the VPN security settings of the PMC-5151. Please refer to the description of the web setting page as below:

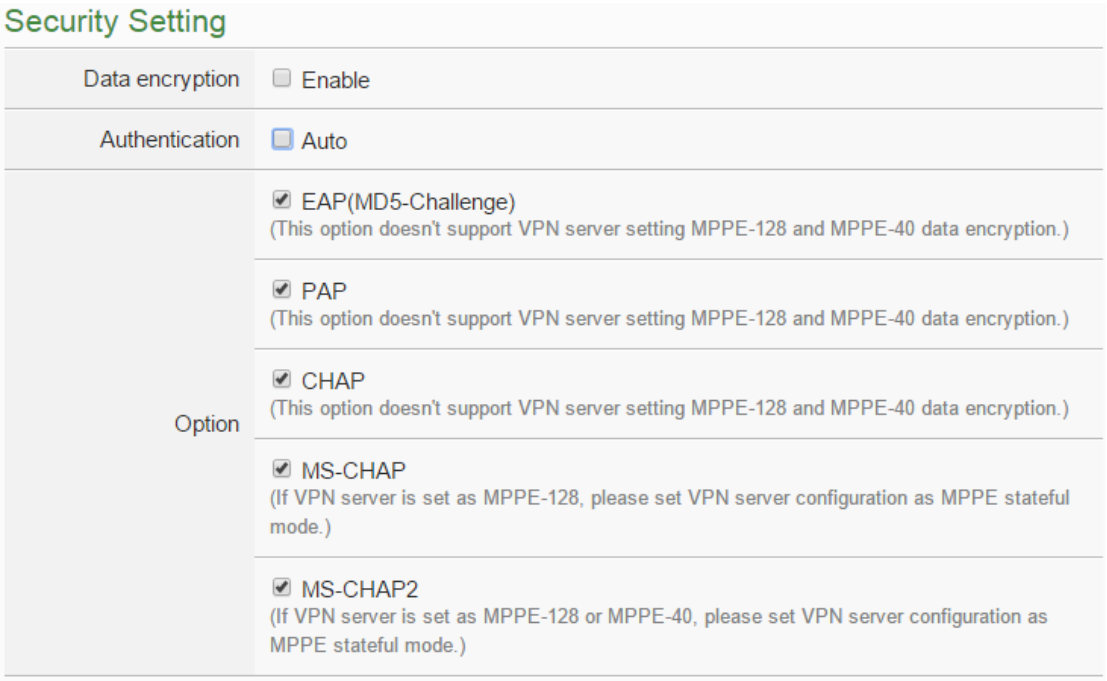

Security Setting
Data encryption
Enable
Authentication
Auto
Option
EAP(MD5-Challenge)
(This option doesn't support VPN server setting MPPE-128 and MPPE-40 data encryption.)
PAP
(This option doesn't support VPN server setting MPPE-128 and MPPE-40 data encryption.)
CHAP
(This option doesn't support VPN server setting MPPE-128 and MPPE-40 data encryption.)
MS-CHAP
(If VPN server is set as MPPE-128, please set VPN server configuration as MPPE stateful mode.)
MS-CHAP2
(If VPN server is set as MPPE-128 or MPPE-40, please set VPN server configuration as MPPE stateful mode.)

Figure6-7 : Security setting interface of VPN function

6.4 SNMP Setting

The PMC-5151 provides SNMP(Simple Network Management Protocol) V1 and V2c to work with the SNMP Network Management software for monitoring the system data, power meter data and I/O module data.The SNMP Setting page allows you to enable or modify the settings of the SNMP function on the PMC-5151. The following figure illustrates the set up interface:

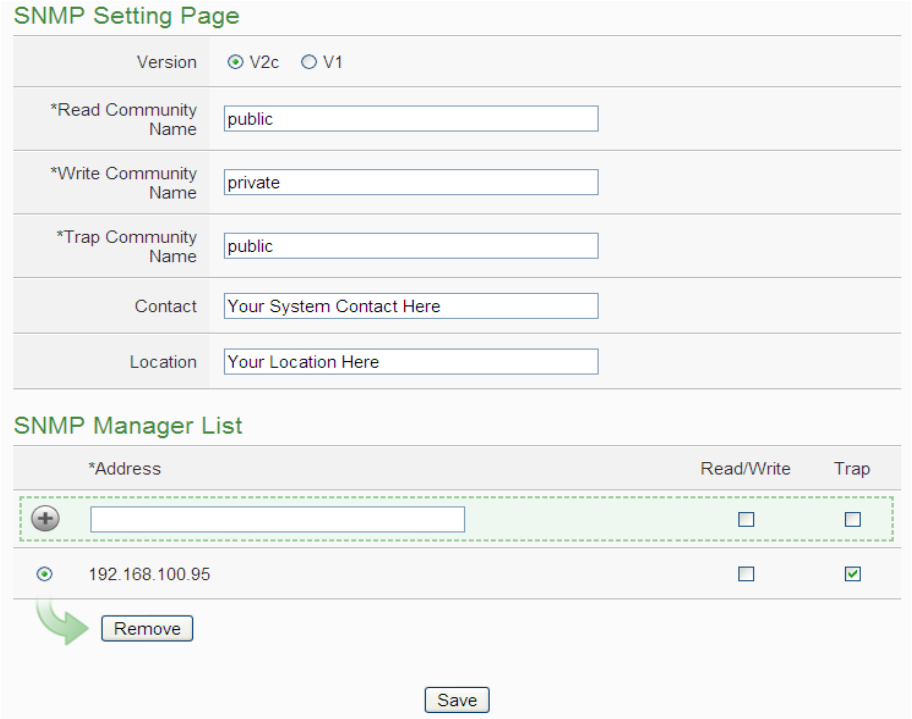


Figure6-8 : SNMP Setting Page

Please follow the steps below for the SNMP Settings：

i. In the “Version” field, select the SNMP version that you want to use. Currently PMC-5151 supports SNMP V2c and V1 protocol,

ii. In the “Read Community Name” field, input a string for “Read Community Name” for SNMP function. The default string is “public”.

iii. In the “Write Community Name” field, input a string for “Write Community Name” for SNMP function. The default string is “private”.

iv. In the “Trap Community Name” field, input a string for “Trap Community Name” for the SNMP function. The default string is “public”.

v. In the “Contact” field, input the “Contact” string.

vi. In the “Location” field, input the “Location” string,

The SNMP Manager List is a list for all SNMP Managers which will interact with the SNMP Agent of PMC-5151. Please follow the steps as below to perform the setting for SNMP Managers. After all settings are completed, click “Save” button to save the changes.

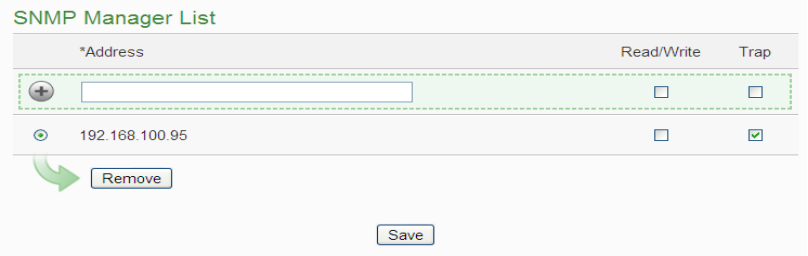


Figure6-9 : SNMP Manager List

i. Set up IP Address or domain name of the SNMP Manager that you want to add. Please set up the Address appropriately, if the settings are not the same as the settings of the SNMP Manager, the interaction between PMC-5151 and the SNMP Manager will be failed.

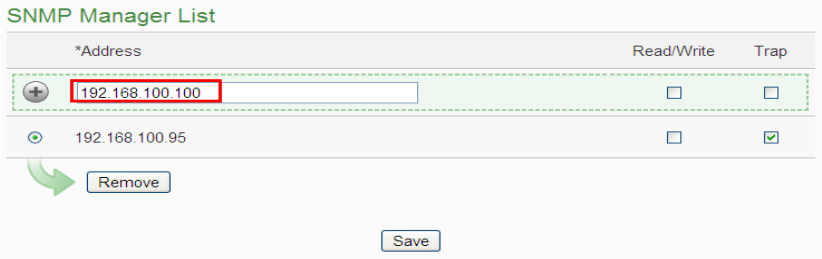


Figure6-10 : The Address Setting for SNMP Manager

ii. Click to Enable (or Disable) the working model between the SNMP Manager and the SNMP Agent of PMC-5151. Currently PMC-5151 provides two working models as Read/Write (Polling) and Trap for SNMP Manager.

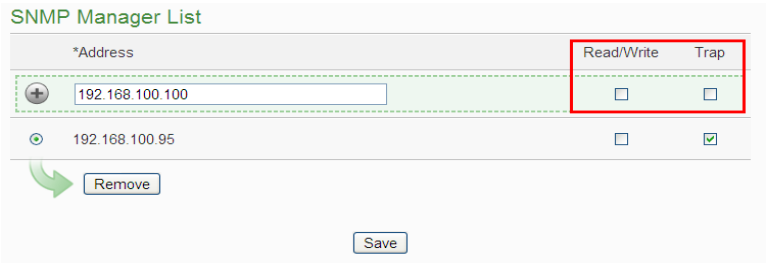


Figure6-11 : The Working Model Setting for SNMP Manager

Please Note: If no "Read/Write" field on the list is enabled to accept

the Read/Write commands, indicating that it will allow accepting the Read/Write commands from ANY SNMP Manager.

iii. After completing the IP address and working model setting, please click button to add the SNMP Manager to the list. After adding the SNMP Manager, click “Save” button to save the changes.

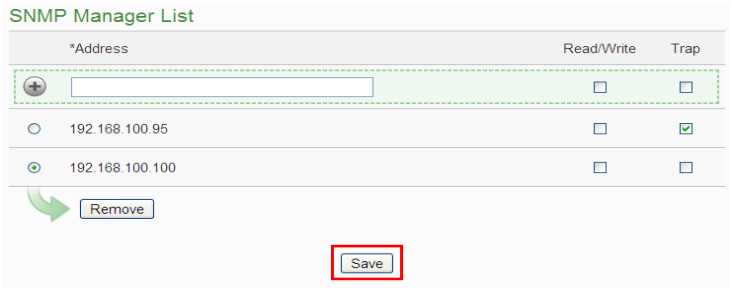


Figure6-12 : Save the SNMP Manager Setting

6.5 Security Setting

Security Setting allows user to change the password that is required when access to PMC-5151. The user could also modify the settings of FTP Server and Idle Time. The Security Setting page is as follow:

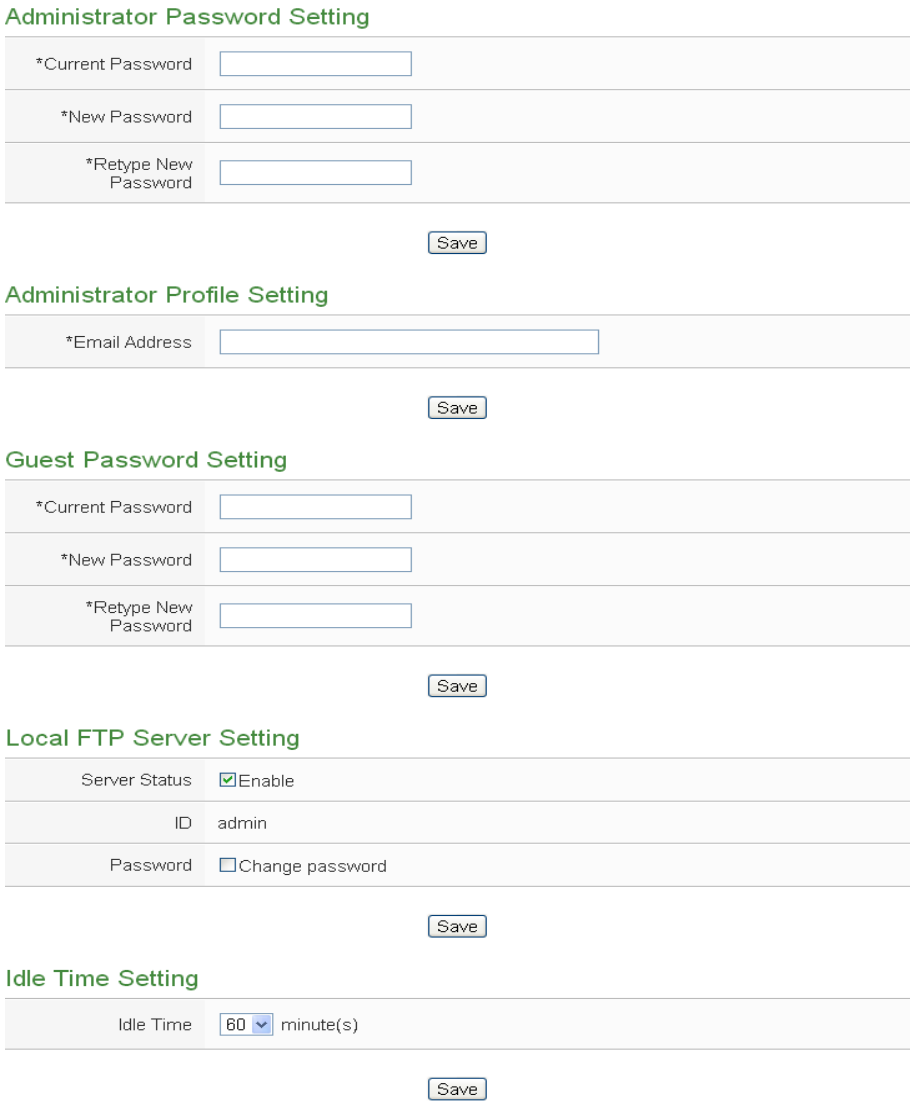


Figure6-13 : Security Setting Page

- Password Setting

PMC-5151 provides two passwords sets, one for Administrator, the other for Guest. The default password for Administrator is “Admin” and “User” for Guest. The user can modify the password in the “Password Setting” section; the Password length is limited to 16 characters. After all settings are completed, click “Save” button to save the changes. In addition, if login as the Administrator, in the “Administrator Profile Setting” section, the users could input an email address, once the password is forgotten or lost, the PMC-5151 could send an email with the passwords (administrator and guest) to this email address, for more detailed

information, please refer to Appendix II.

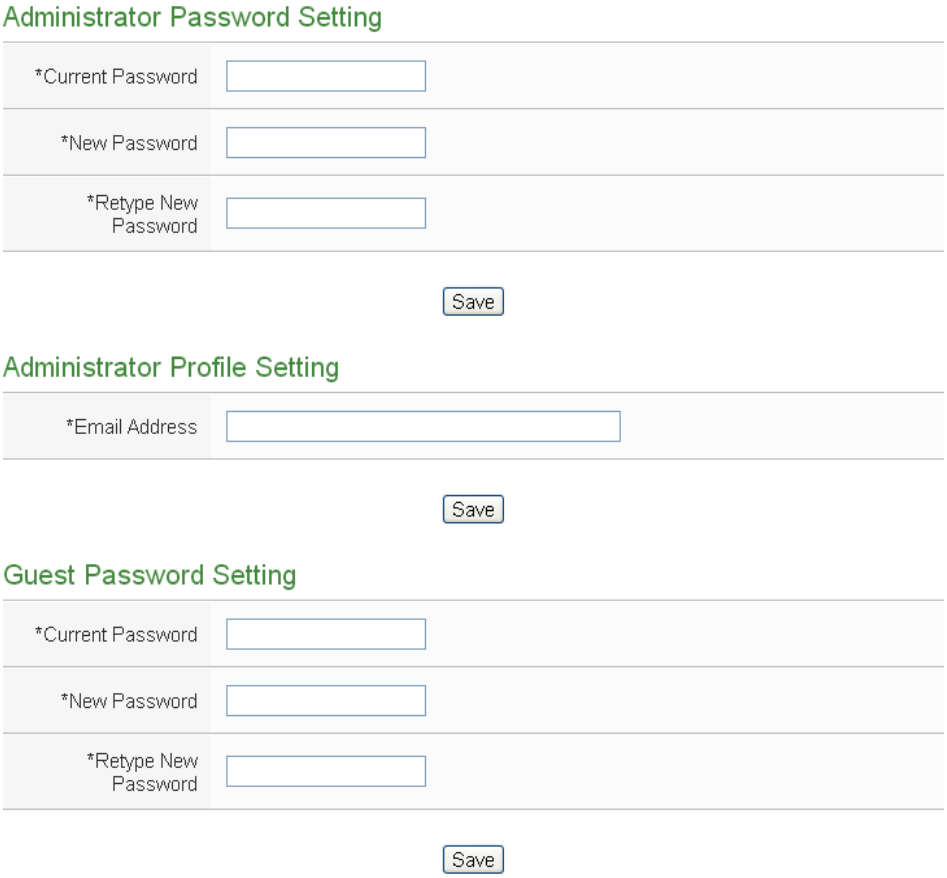


Figure6-14 : Password Setting Page

- Local FTP Server Setting

  In this section, it allows to enable or disable the FTP Server function on the PMC-5151 side. The user could connect to PMC-5151 FTP Server via FTP software to remotely retrieve event log or data record file. To enable this function, check "Enable" in the "Server Status" field. The default password is "Admin", the user could modify the password of the FTP Server on the PMC-5151 side if required.

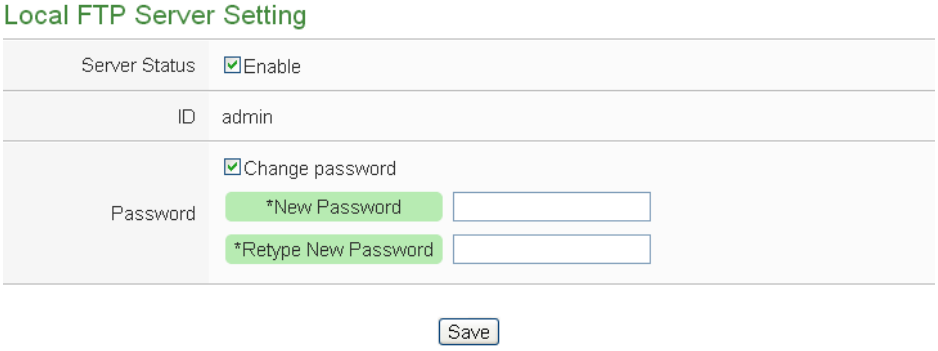


Figure6-15 : Local FTP Server Setting Page

- Idle Time Setting

  After the administrator login into the PMC-5151 page, when the idle time exceeds the pre-set time interval (default is 10 minutes), the administrator will be automatically logout. The idle time could be set as Disable/10/20/30/60 minutes, after the setting is completed, click "Save" button to save the changes.

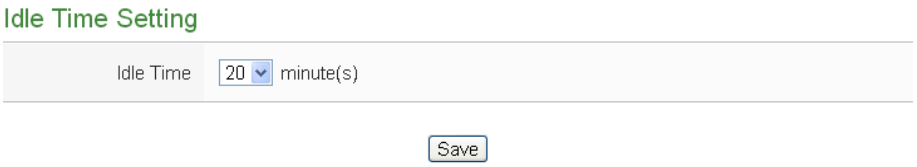


Figure6-16 : Idle Time Setting Page

6.6 I/O Interface Setting

I/O Interface Setting allows to setup the function settings on COM1, COM2, COM3 or LAN. The setting interface is shown as below:

Figure6-17 : I/O Interface Setting Page

The I/O interface on PMC-5151 includes:

- COM1(RS-232)

  Reserved specifically for Modbus RTU Slave for connections to HMI or SCADA.

- COM2 / COM3 (RS-485)

  Reserved for Modbus RTU Master to connect Modbus RTU slave devices or for Modbus RTU Slave to connect HMI or SCADA.

- LAN

  LAN connection is by default set for Modbus TCP Slave to connect HMI or SCADA. It can also be set for Modbus TCP Mater to connect Modbus TCP devices.

The following section will introduce how to set I/O interface for different functions:

- Connect to HMI or SCADA via COM Port

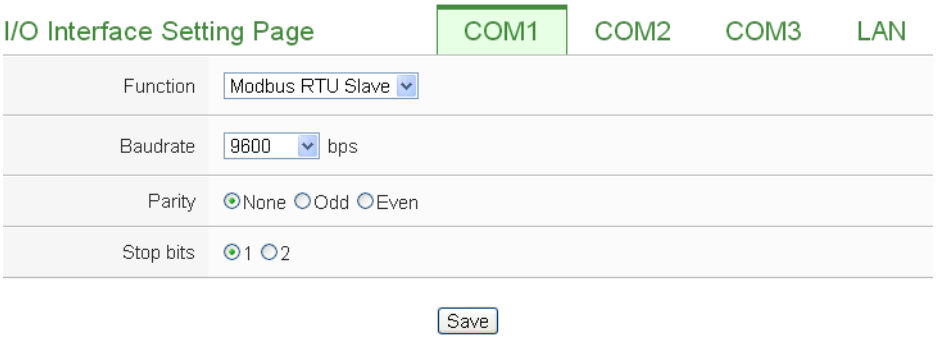


Figure6-18 : Function setting to connect to HMI or SCADA

The settings steps are as below:

vii. In the "Baudrate" field, select the Baudrate from the dropdown list, the Baudrate of PMC-5151 and HMI or SCADA have to be set the same.

viii. In the "Parity" and "Stop bits" fields, set up the Parity and Stop bits. The Parity and Stop bits of PMC-5151 and HMI or SCADA have to be set the same.

ix. After all settings are completed, click "Save" button to save the changes.

- Connect to Modbus RTU slave device via COM Port.

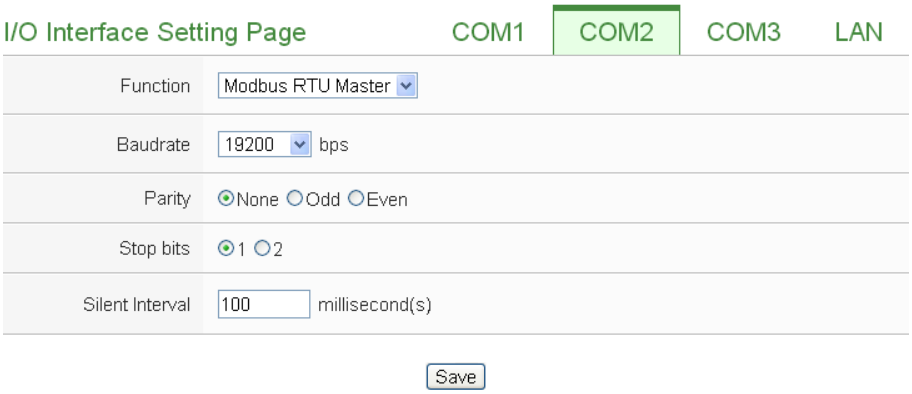


Figure6-19 : Function setting to connect to Modbus RTU slave device

The settings steps are as below:

i. In the "Baudrate" field, select the Baudrate from the dropdown list, the Baudrate of PMC-5151 and Modbus RTU slave device have to be set the same.

ii. In the "Parity" and "Stop bits" fields, set up the Parity and Stop bits.

The Parity and Stop bits of PMC-5151 and Modbus RTU slave device have to be set the same.

iii. In the “Silent Interval” field, input the the time interval between successive sending of commands from the PMC-5151to the Modbus RTU slave device, the unit will be millisecond (ms).

Please Note: After the “Baudrate” is selected, the system will automatically generate a proper value in the “Silent Interval” field. For each Modbus RTU Slave device has different Modbus command process capability, the response time for sending result from Modbus RTU Slave device to PMC-5151 might be different. The user can adjust this value to most appropriate time interval, such as: extend this value to make sure every Modbus RTU Slave device connected to the PMC-5151 has enough time to process the Modbus command, or shorten this value to improve the efficiency of the poll mechanism between Modbus RTU Slave device and PMC-5151.

iv. After all settings are completed, click “Save” button to save the changes.

- Connect to HMI (or SCADA) and Modbus TCP Slave device via LAN

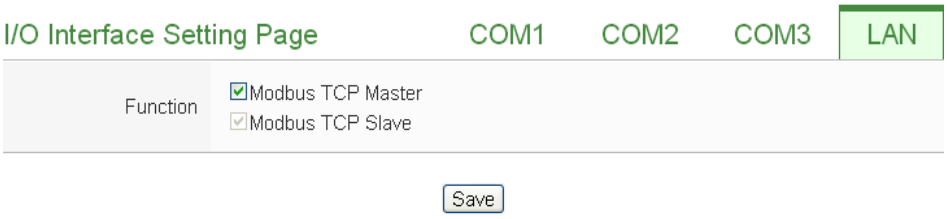


Figure6-20 : I/O Function setting about LAN

The LAN function on PMC-5151 is by default set for Modbus TCP Slave to connect HMI or SCADA. User can also select the “Modbus TCP Master” Checkbox to enable the Modbus TCP Mater function for connecting to Modbus TCP Slave devices through Ethernet.

6.7 Other Setting

In the “Other Setting” section, it allows to set up Contract Capacity Setting, Demand Interval Setting and Carbon Footprint Setting. The setting interface is shown as below:

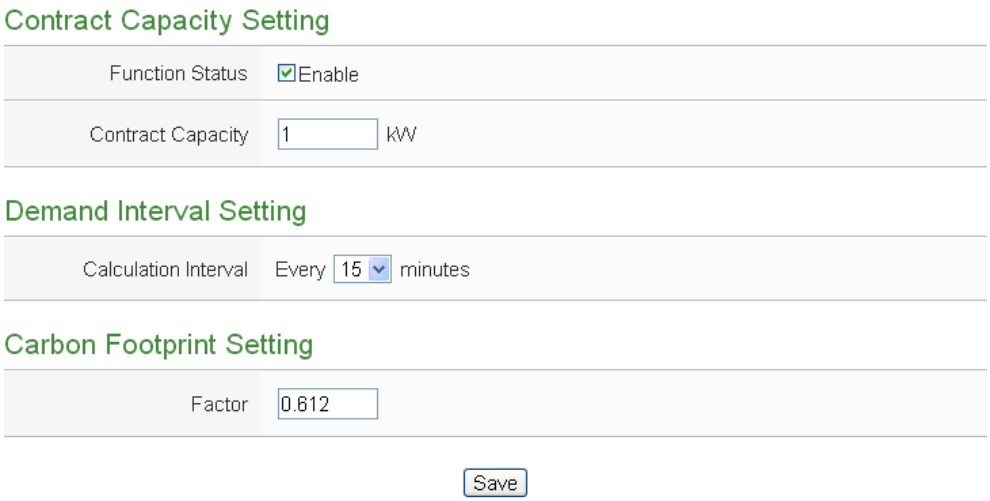


Figure6-21 : Other setting page

- Contract Capacity Setting

  In this section, it allows to enable and set Contract Capacity. To enable the Contract Capacity function, click on “Enable” and input the Contract Capacity. Click “Save” button to save the settings. The Contract Capacity being set will be displayed on the System Setting main page.

- Demand Interval Setting

  In this section, it allows to set Demand Interval Setting. The system will calculate the demand according to this demand interval. The default interval is 15 minutes; the user could set the interval to be 15/30/60 minutes. Click “Save” button to save the settings.

- Carbon Footprint Setting

  In this section, it allows to set Carbon Footprint Setting. Please input the Carbon Footprint factor based on the Carbon Footprint factors for countries worldwide that the International Energy Agency (IEA) published.

6.8 Power Meter Group Setting

The power meter group setting function allows user to create groups that contain specific loops/phases of power meters for easy group classification. These pre-set groups can be inquired in “Power Data Information”and “Historical Electricity Analysis”pages for power data analysis. The power meter group setting page is shown as below:

Figure6-22 : Power Meter Group Setting

Please refer to the following chapters to setup the group/subgroup and click the “Save” button to save the chages.

6.8.1 Group and Subgroup Viewing

Click the group or subgroup bar to expand/hide the lists.

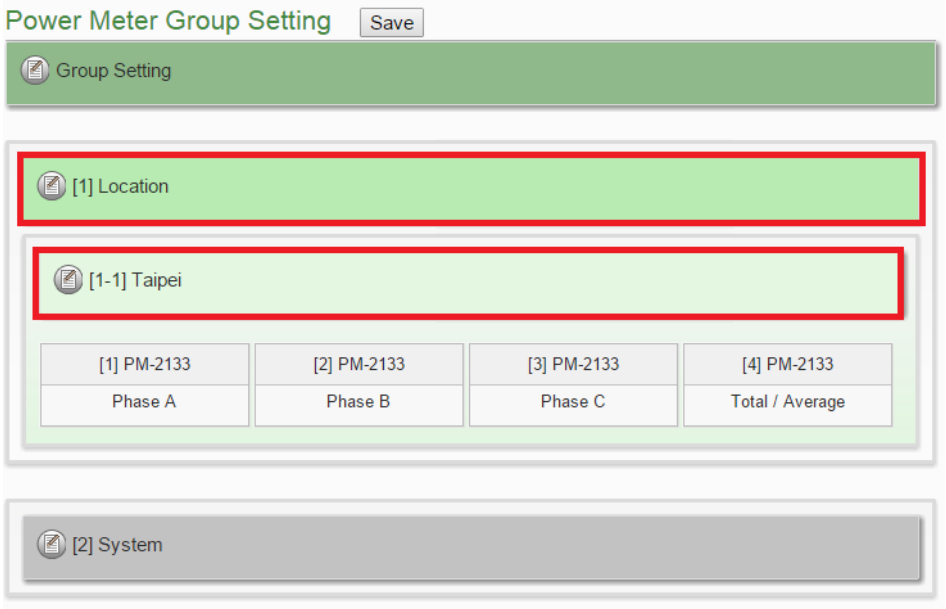


Figure6-23 : Group and Subgroup Viewing

6.8.2 Group and Subgroup Setting

i Click the "Set up" button ( ) of group or subgroup to open the setting window.

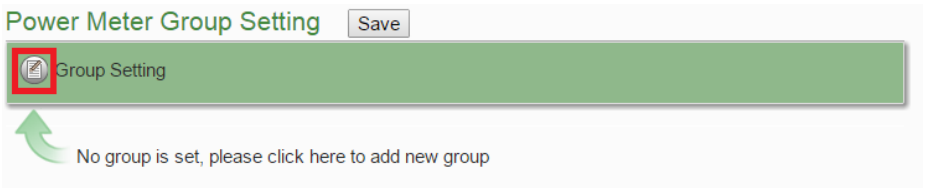


Figure6-24 : Group Setting

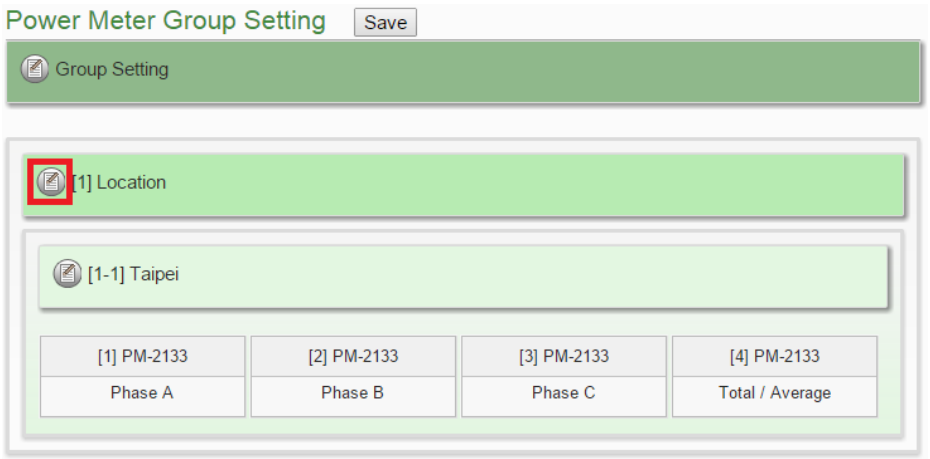


Figure6-25 : Subgroup Setting

ii Input the group/subgroup name and click to add this group/subgroup to the lists(Figure 6-26). Click "Close" button to return to group setting page.

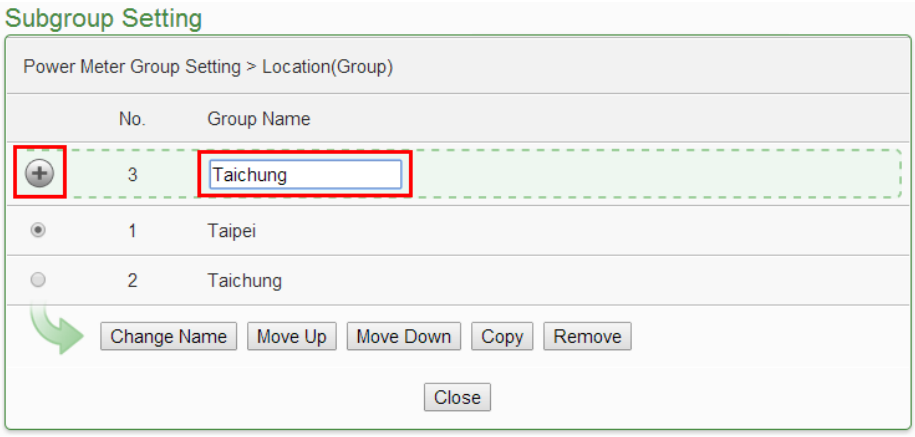


Figure6-26 : Subgroup Setting Window

6.8.3 Group and Subgroup configuration

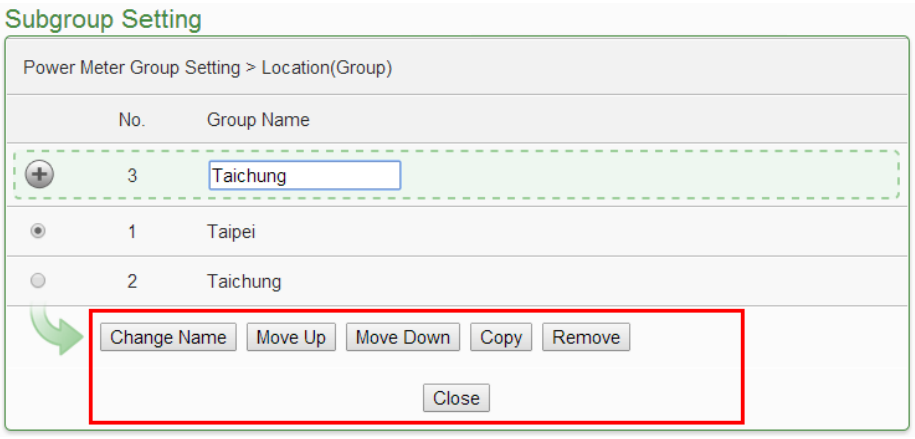


Figure6-27 : Configurations for Subgroup

The group/subgroup configurations can be done on the Group/Subgroup Setting page. Please select the group/subgroup first and click on the function button to perform the configurations:

- Change Name：Click the radio button in front of the group and click on “Change Name” to change the name of selected group. Click “OK” button to save the changes.
- Move Up：Click the radio button in front of the group name and click on “Move Up” to move the group to upper order (upper index number (No.)).
- Move Down：Click the radio button in front of the group and click on “Move Down” to move the group to lower order (lower index number (No.)).
- Copy：To copy the settings of a pre-set group to the new group, please click the radio button in front of the pre-set group and then click on “Copy”, a new group (in sequence) will be added to the list and the settings of the old group will be copied to this newly added group.
- Remove：Click the radio button in front of the group and click on “Remove” to remove the selected group.
- Close：Click the “Close” button to return to group setting page.

6.8.4 Setup the loops/phases of the subgroup

i Click the "Set up" button ( ) of subgroup to open the setting window.

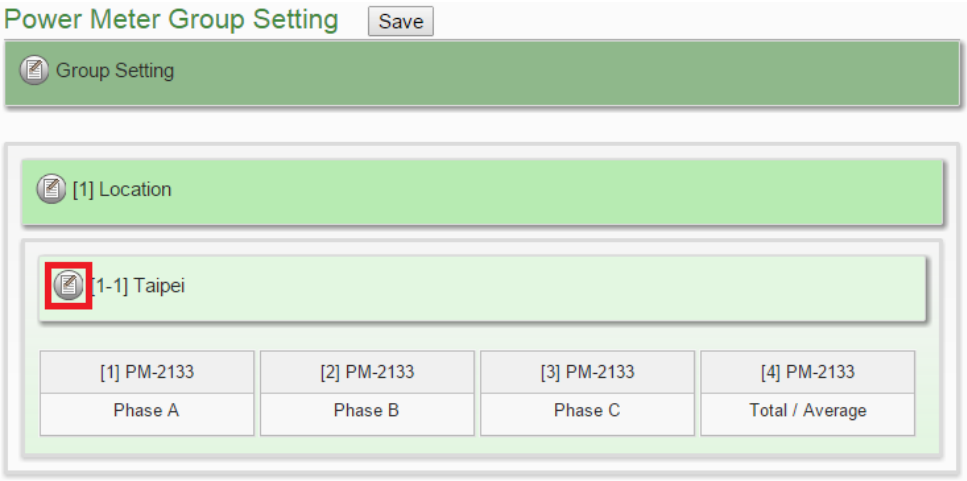


Figure6-28 : Loops/Phases of subroup Setting

ii Select the loop/phase of the power meter (Figure 6-29) and click to add this loop/phase to the lists(Figure 6-30). Click "Close" button to return to group setting page.

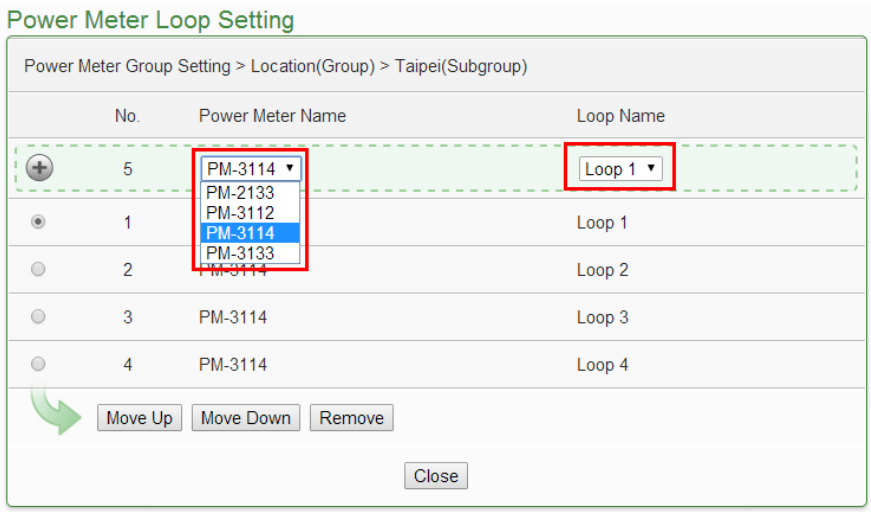


Figure6-29 : Choose Loops/Phased of Subgroup

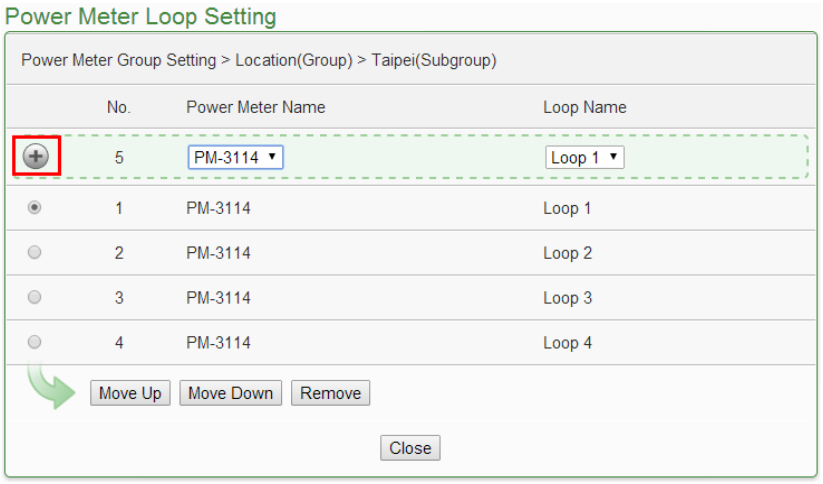


Figure6-30 : Add Loops/Phases for Subgroup

6.8.5 Loop/Phase of group configuration

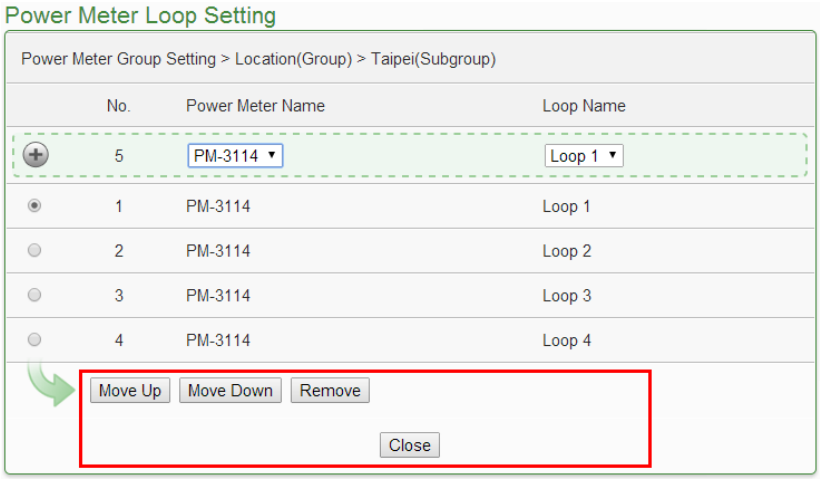


Figure6-31 : Configurations for Loops/Phased of Subgroup

The loop/phase of subgroup configurations can be done on the Power Meter Loop Setting page.. Please select the loop/phase first and click on the function button to perform the configurations:

- Move Up：Click the radio button in front of the loop/phase name and click on “Move Up” to move the loop/phase to upper order (upper index number (No.)).
- Move Down：Click the radio button in front of the loop/phase and click on “Move Down” to move the loop/phase to lower order (lower index number (No.)).
- Remove：Click the radio button in front of the loop/phase and click on “Remove” to remove the selected loop/phase.
- Close：Click the “Close” button to return to group setting page.

6.9 Firmware Update

PMC-5151allows to update firmware via browser, after the update is completed; the PMC-5151 doesn't require to reboot. Please follow the steps below:

i. Please contact ICP DAS service to obtain the latest version of the PMC-5151 firmware file.

ii. Go to "System Setting" page, under the "Firmware Update Setting", click on "Browse".

Figure6-32 : Firmware Update(1)

iii. Browse through to select the new firmware file and click “Open”.

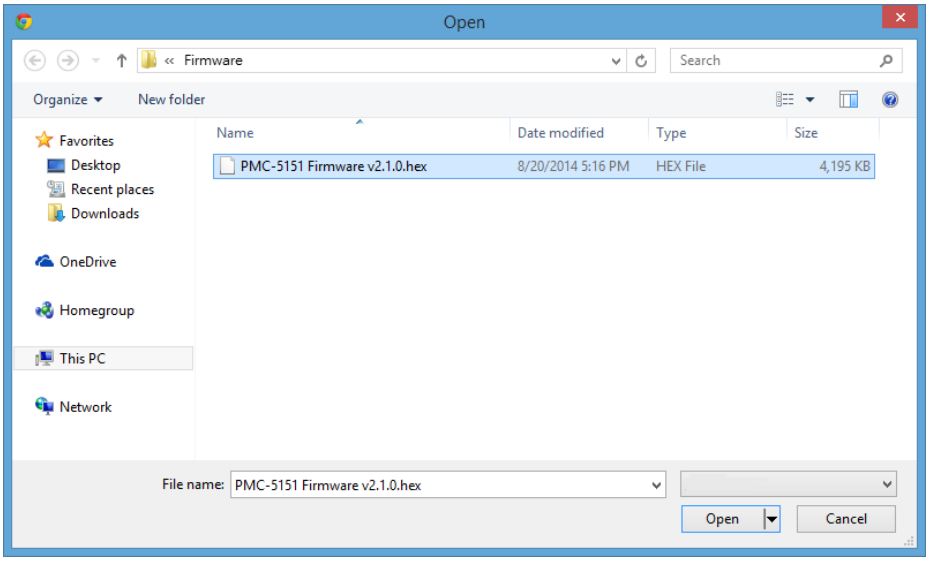


Figure6-33 : Firmware Update(2)

iv. Click “Update” to update the firmware.

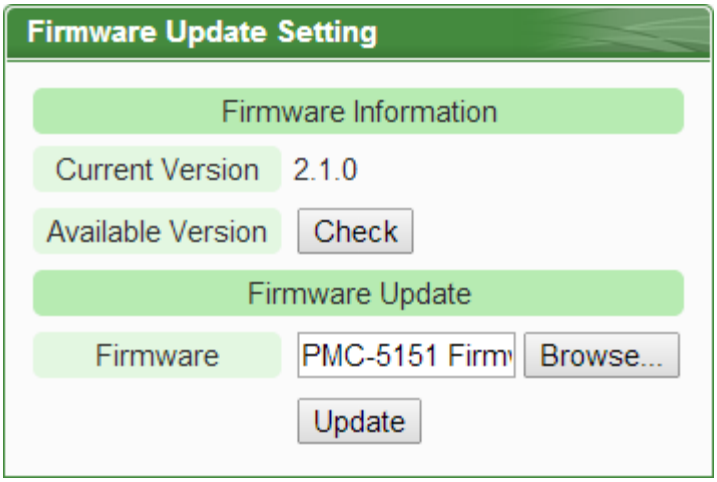


Figure6-34 : Firmware Update(3)

v. Click “OK” to start the firmware update, to cancel the firmware update, click “Cancel”.

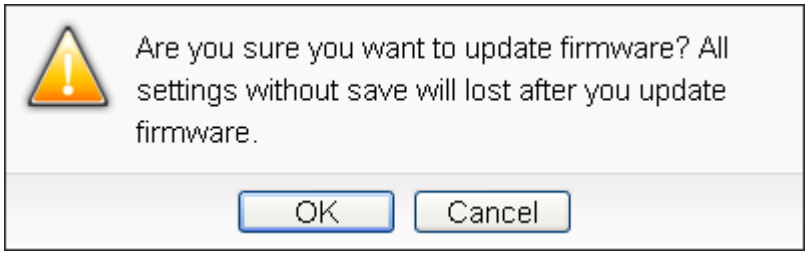


Figure6-35 : Firmware Update(4)

vi. Updating the firmware

Please note: when the firmware update process is started, please DO NOT close the update window or perform any system modification, or may result in unexpected failures.

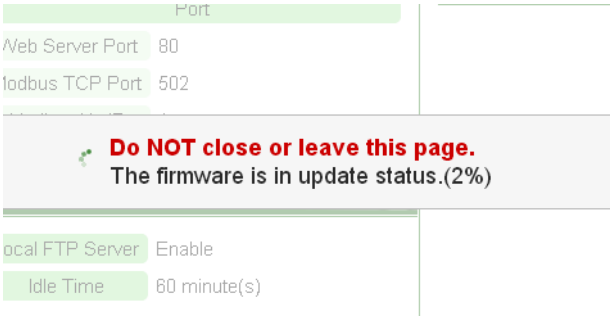

Port
Web Server Port 80
Modbus TCP Port 502
Do NOT close or leave this page.
The firmware is in update status.(2%)
Local FTP Server Enable
Idle Time 60 minute(s)

Figure6-36 : Firmware Update(5)

vii. Click "OK" to complete the update process. After the update is completed, please clear the cache and cookies on your browser. If the update process is failed, please perform the update again.

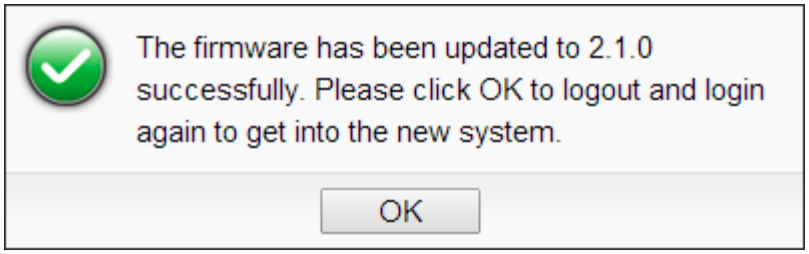


Figure6-37 : Firmware Update(6)

7 Power Meter / I/O Module Setting

Meter / Module Setting page allows to perform settings of the power meters and I/O Modules that are connected to the PMC-5151. After getting into the setting page, the overview page will display current setting of the power meters and I/O Modules that are connected to the PMC-5151, shown as below:

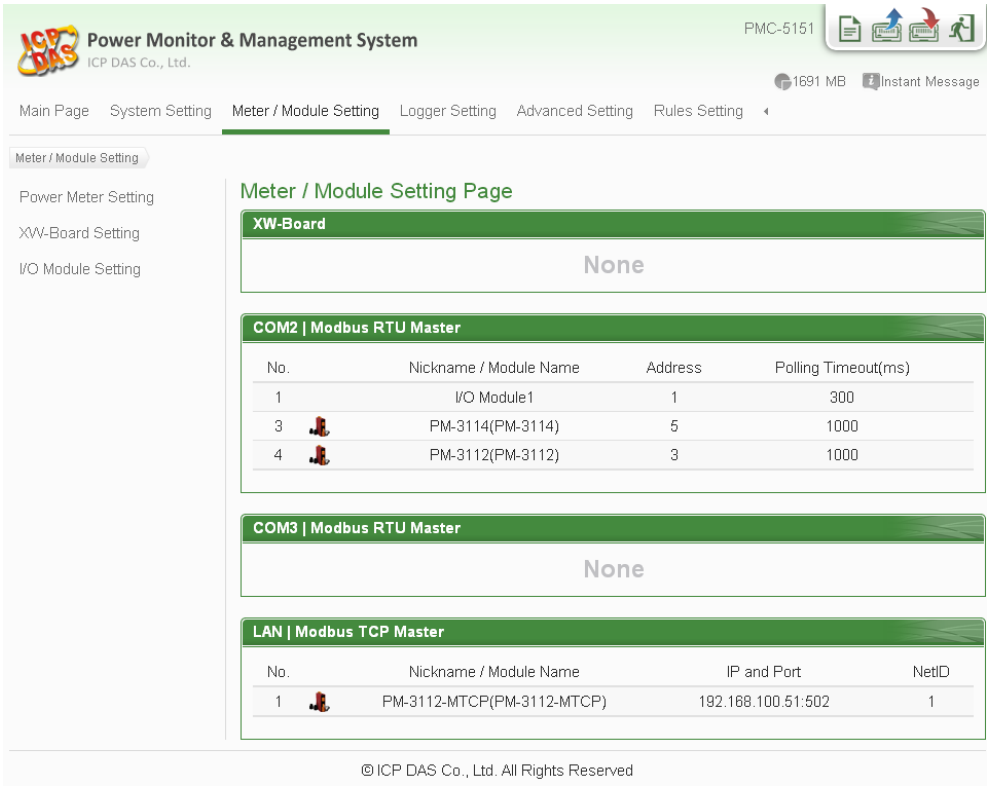


Figure7-1 : Meter / Module Setting Page

Meter/Module Setting includes the following 3 setting options:

- Power Meter Setting
- XW-Board Setting
- I/O Module Setting

More detailed information for each function setting will be given in the following sections:

7.1 Power Meter Setting

On the “Power Meter Setting” page, it allows to set up the settings of the Modbus RTU and Modbus TCP power meters that are connected to the PMC-5151. The Power Meter Setting page is shown as below:

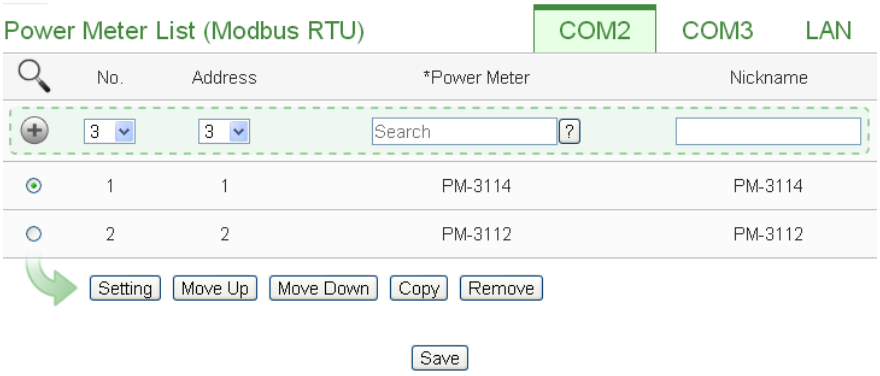


Figure7-2 : Power Meter Setting Page

On the Power Meter Setting page, a list for all power meters connected to the PMC-5151 will be displayed. Please follow the following sections to perform settings for Modbus RTU and Modbus TCP power meters. After all settings are completed, click “Save” button to save the changes.

Please note:

1. PMC-5151 provides COM2(RS-485) and COM3(RS-485) interface that allows connections to Modbus RTU power meters.
2. PMC-5151 provides LAN interface that allows connections to Modbus TCP power meters. For more detailed information about LAN settings please refer to “6.4 I/O Interface setting”.
3. One PMC-5151 allows connections to at most 24 ICP DAS Modbus power meters (including Modbus RTU and Modbus TCP power meters.)
4. A single I/O interface (COM2, COM3 or LAN) allows connections to at most 16 devices (Power meters and I/O modules); each device requires its own index number. Therefore, if an I/O interface is connecting to both power meters and I/O modules, they will share the same set of the index numbers. For example, if COM2 is connecting to 2 Modbus RTU power meters and already takes the index numbers No.1 and No.2, the Modbus RTU I/O modules that are going to be connected to COM2 can be only set as No.3 ~ No.16 that are not occupied.

7.1.1 Scan to add Modbus RTU Power Meters

Perform “Scan” to automatically build a list of Modbus RTU power meters that are connected to the PMC-5151. The steps are as below:

i Before performing the scan of the power metters, please make sure the RS-485 wirings connecting to the PMC-5151 and the power meters function well, and make sure the settings of the addresses of the power meters are completed.

ii Click to start the scan of Modbus RTU power meters that are connected to the PMC-5151.

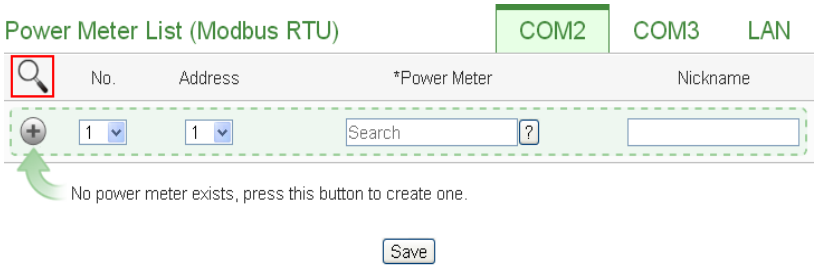


Figure7-3 : The “Scan” button to search Power Meter

iii When the Scan page appears (Figure 7-4), input the starting address and the ending address of the Modbus address that are going to perform scan. Click on “Scan”, the system will start to scan the power meters that match the settings previously set, to cancel the scan, click on “Cancel”.

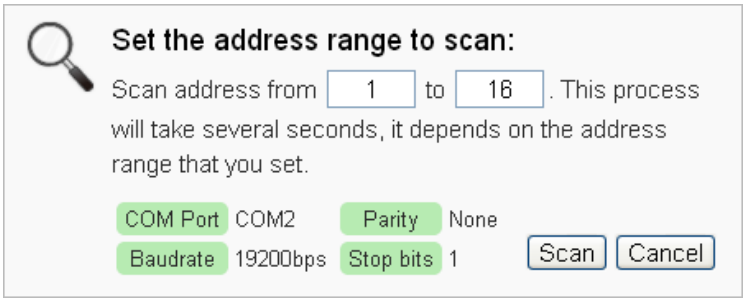

Set the address range to scan:
Scan address from 1 to 16 . This process will take several seconds, it depends on the address range that you set.
COM Port COM2
Parity None
Baudrate 19200bps
Stop bits 1
Scan
Cancel

Figure7-4 : Set up the Scanning Range for the Power Meters

iv When the system is performing the scan (Figure 7-5), the address that are performing scan will be dynamically shown on the upper left side, please wait till the scan operation is completed. To stop the scan operation, click on “Cancel” to terminal the scan and leave the page.

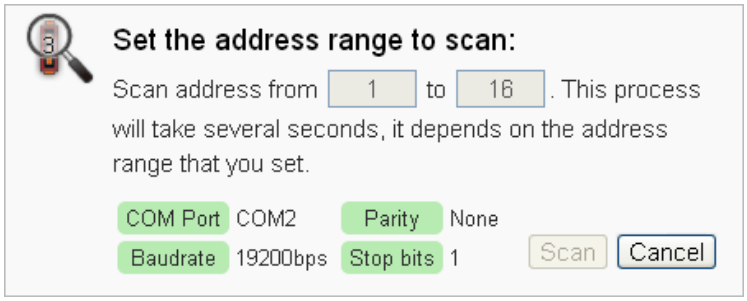

Set the address range to scan:
Scan address from 1 to 16 . This process will take several seconds, it depends on the address range that you set.
COM Port COM2
Parity None
Baudrate 19200bps
Stop bits 1
Scan
Cancel

Figure7-5 : Scaning the Power Meters

v After the Scan operation is completed, a Power Meter List will appear (Figure 7-6). If the newly scaned module doesn't match the module previously set on the same address, a window will appear (Figure 7-7), please select the actual device that are connected to PMC-5151. After all settings are completed, click "Save" button to save the changes.

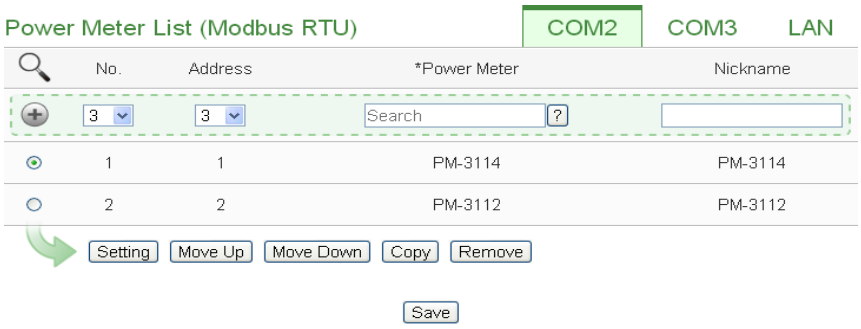


Figure7-6 : The Power Meter List after Scan operation

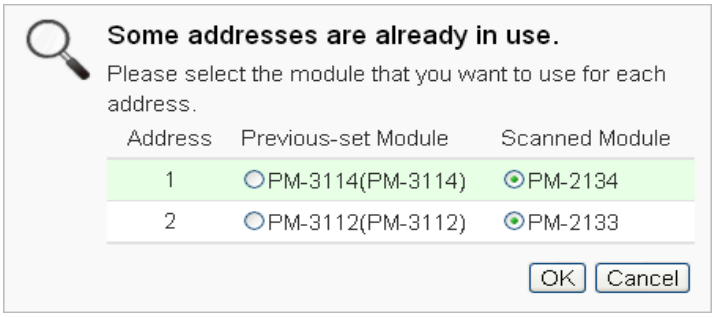


Figure7-7 : Select the actual Power Meter connected to PMC-5151

7.1.2 Add Modbus RTU Power Meter manually

In addition to perform Scan operation to automatically add Modbus RTU power meters to the list, the user could also add the Modbus RTU power meter manually one by one, the steps are as below:

i No: The number will be the order that the power data of the Modbus RTU power meter being stored in the PMC-5151 Modbus Table. The range is 1~16.

ii Address: The address will be the Modbus address of this Modbus RTU power meter, please make sure the address setting is the same as the settings of the module, if the setting is not accurate, the connection for PMC-5151 to the power meter will be failed.

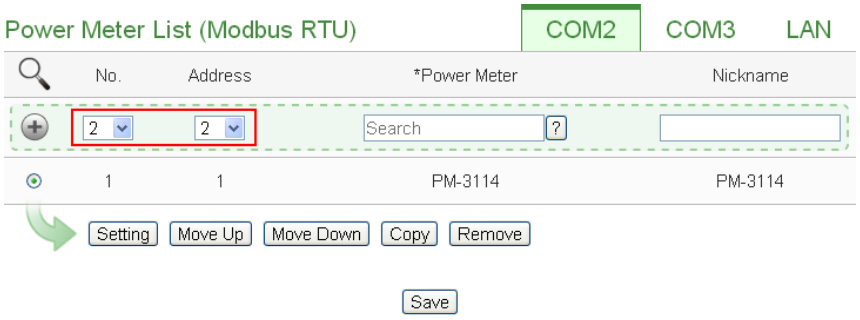


Figure7-8 : Set up the No and Address of the power meter

iii Select the Power meter model:

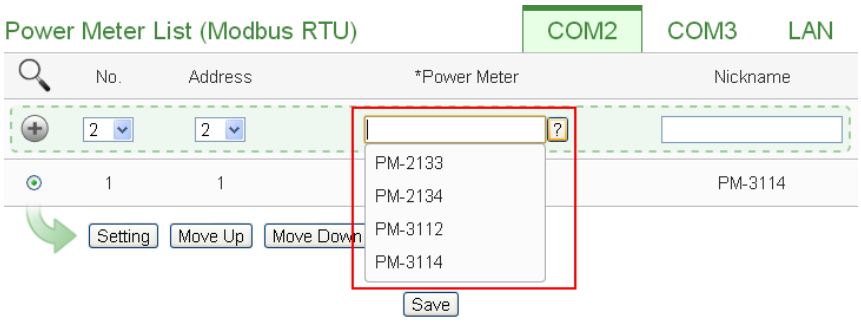


Figure7-9 : Select Modbus RTU Power Meter model

iv Nickname: For user to define a nickname for this power meter, this nickname will be displayed on the “Power meter Information” and “Rule Setting” pages. Default setting will be the model of the power meter.

v Click ⊕ to add the meter to the list (Figure 7-10). After adding the power meter, click “Save” button to save the changes.

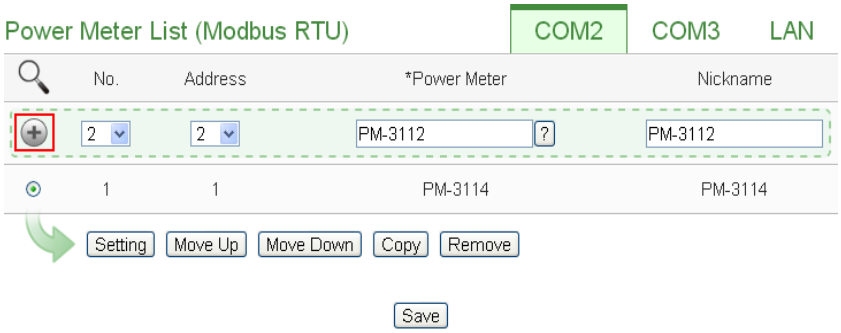


Figure7-10 : Add the Modbus RTU Power Meter mannually

7.1.3 Add Modbus TCP Power Meter manually

PMC-5151 allows connection to Modbus TCP Power Meters via Ethernet, the user could add the Modbus TCP Power meter to the list manually; the steps are as below:

i No: The Number will be the order that the power data of the Modbus TCP power meter being stored in the PMC-5151 Modbus Table. The range is 1~16.

ii Network: Set up the settings of IP, Port and NetID appropriately as required. Please make sure the network setting is the same as the settings of the module, if the setting is not accurate, the connection for PMC-5151 to the power meter will be failed.

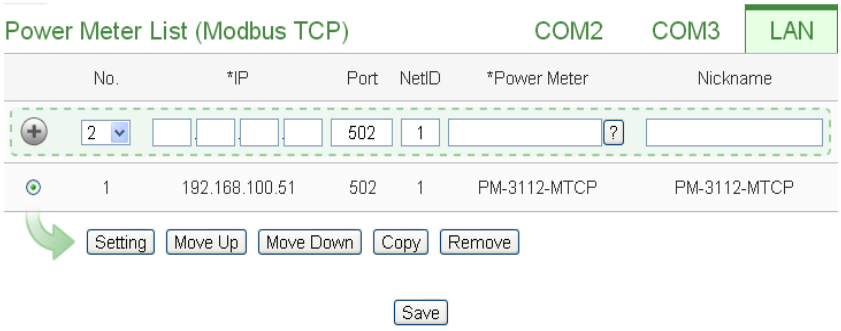


Figure7-11 : Add Modbus TCP Power Meter

iii Select the Power meter model (Figure 7-12):

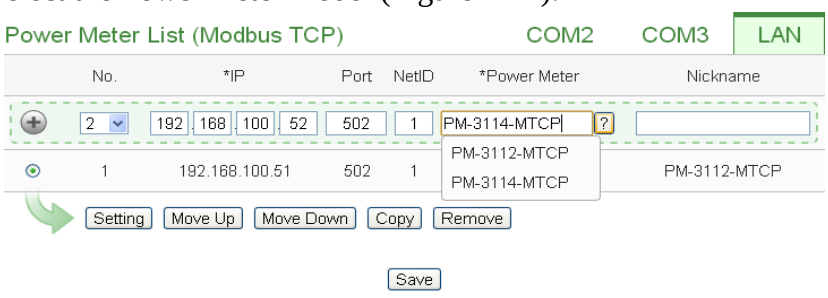


Figure7-12 : Select Modbus TCP Power Meter model

iv Nickname: For user to define a nickname for this power meter, this

nickname will be displayed on the “Power meter Information” and “Rule Setting” pages. Default seting will be the model of the power meter.

v Click to add the meter to the list (Figure 7-13). After adding the power meter, click “Save” button to save the changes.

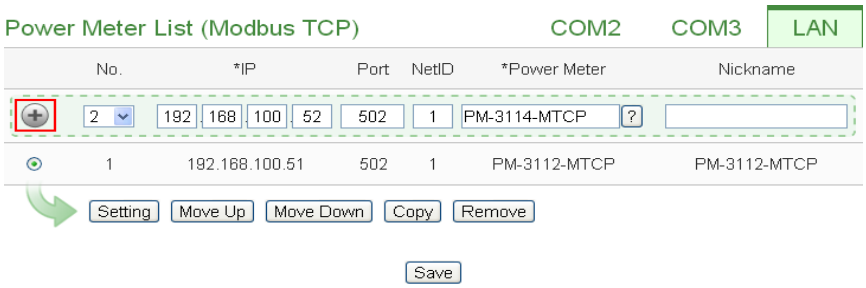


Figure7-13 : Add the Modbus TCP Power Meter mannually

7.1.4 Power Meter List Interface

After the Modbus RTU/TCP Power Meters are added to the power meter list via auto scan or manual work, the Modbus RTU/TCP Power Meters will be listed as below:

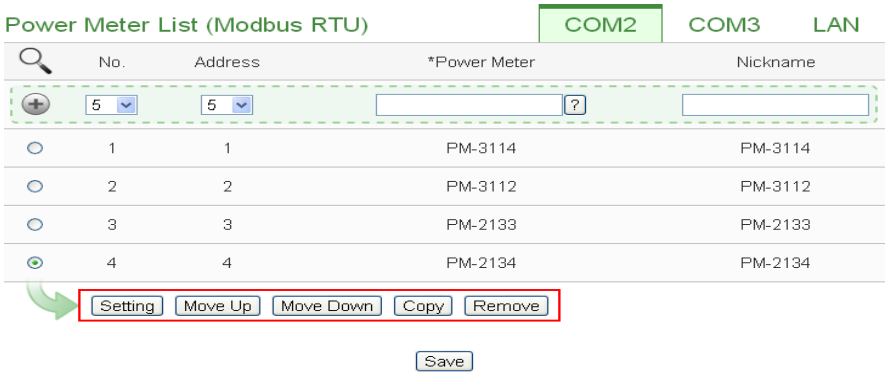


Figure7-14 : Power Meter List Interface

The following functions allow to perform settings or rearrange order of the power meters. Please select the power meter and click on the function button to perform the operations:

- Setting: Click the radio button in front of the power meter and click on “Setting” to get into the setting page of the power meter. The settings for each power meter module will be given in the following section.
- Move Up: Click the radio button in front of the power meter and click on “Move Up” to move the power meter to upper order (upper index number (No)).

- Move Down: Click the radio button in front of the power meter and click on “Move Down” to move the power meter to lower order (lower index number (No)).
- Copy: To copy the settings of a pre-set power meter to the new power meter, please click the radio button in front of the pre-set power meter and then click on “Copy”, a new power meter (in sequence) will be added to the list and the settings of the old power meter will be copied to this newly added power meter.
- Remove: Click the radio button in front of the power meter and click on “Remove” to remove the selected power meter.

After all settings are completed, click “Save” button to save the changes.

7.1.5 Modbus RTU Powe Meter Setting

PMC-5151 support ICP DAS Single-phase and Three-phase Modbus RTU Powe Meters, the following section will give more detailed settings of each power meter setting page.

- The Three-Phase Modbus RTU Powe Meter Setting page is shown as follow (using PM-3133 as an example):

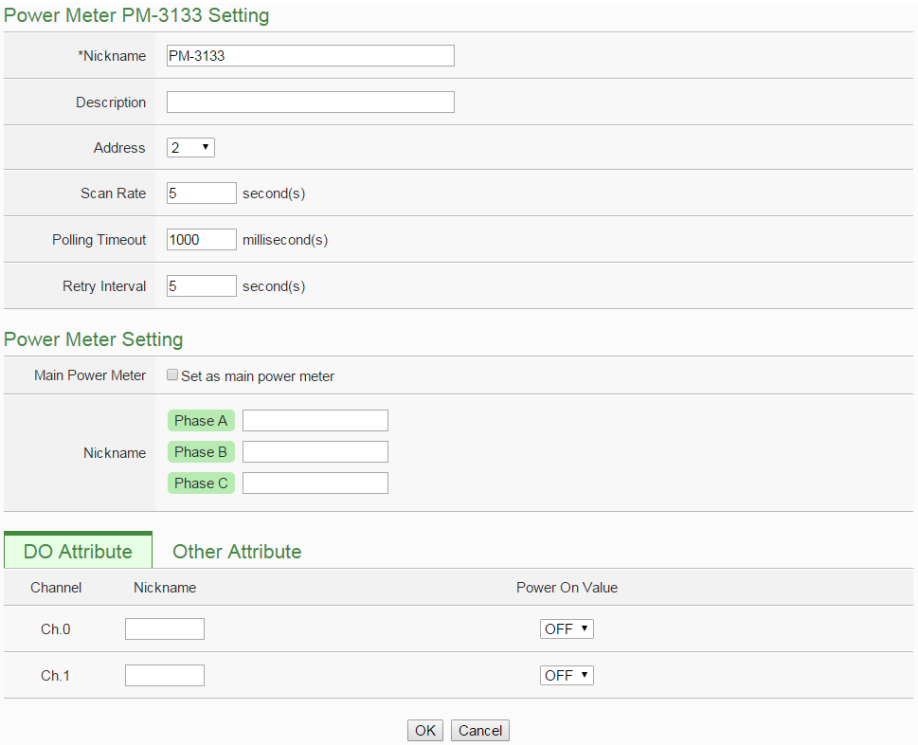


Figure7-15 : PM-3133 Setting Page

The settings are as follow:

- ◆ Nickname：For user to define nicknames for each power meter, this nickname will be displayed on the “Power Meter Information” and “Rule Setting” pages.
- ◆ Description: The Description field provides a space for the user to make a brief description of this power meter.
- ◆ Address: The address will be the Modbus address of this Modbus RTU power meter, please make sure the address setting is the same as the settings of the module, if the setting is not accurate, the connection for PMC-5151 to the power meter will be failed.
- ◆ Scan Rate: Input the time interval for PMC-5151 to periodically retrieve the power data of this Modbus RTU Power Meter, the setting range will be 0 ~ 65535 seconds.
- ◆ Polling Timeout: The time interval for PMC-5151 to send command to the Modbus RTU Power Meter and wait for the response, the unit will be ms. The setting range will be 1-10000 ms.
- ◆ Retry Interval: The time interval to wait for PMC-5151 to repeatedly send command again when PMC-5151 sends command to the Modbus RTU Power Meter and get no response. The unit will be second. the setting range will be 3 ~ 65535 seconds.
- ◆ Main Power Meter: When the “Set as main power meter” is selected, this power meter will be set as main power meter and the power data of this meter will be displayed on the Main Power Meter area on the “Power Data Overview” page.
- ◆ CT/Phase Nickname: For user to define nicknames for each CT (or phase), this nickname will be displayed on the “Power Meter Information” and “Rule Setting” pages. For three-phase power meter, the user could give nicknames to the Phase A/B/C.

After all settings are completed, click “OK” button to return to the Power Meter List.

- The Single-Phase Modbus RTU Powe Meter Setting page is shown as follow (using PM-3114 as an example):

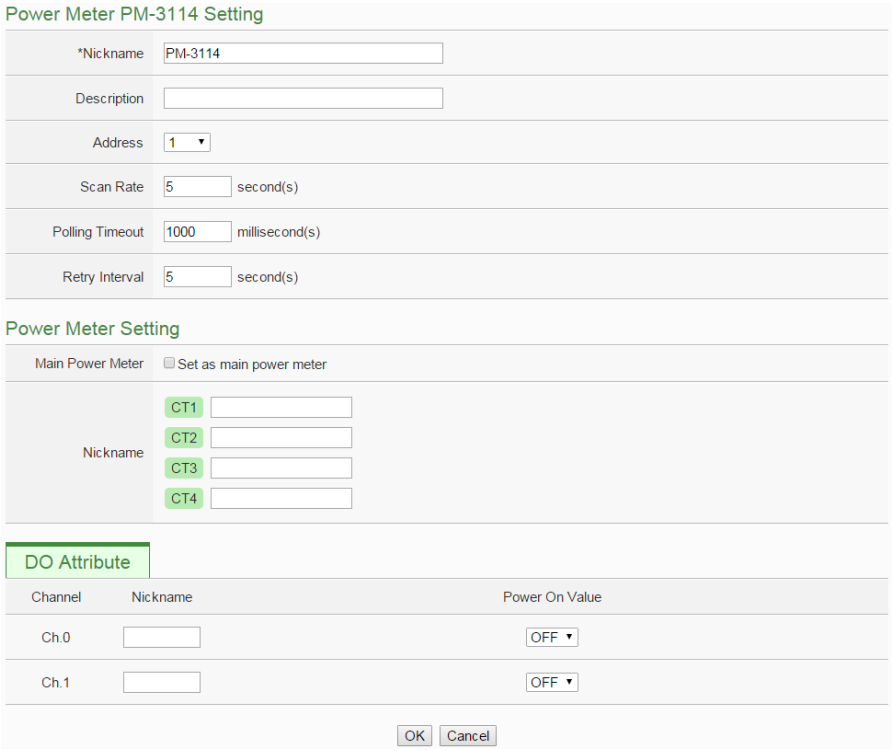


Figure7-16 : PM-3114 Setting Page

The settings are as follow:

- ◆ For the settings of Nickname, Description, Address, Scan Rate, Polling Timeout, Retry Interval and Main Power Meter, please refer to "Three-Phase Modbus RTU Powe Meter Setting" section.
- ◆ CT / Phase Nickname: For user to define nicknames for each CT (or phase), this nickname will be displayed on the "Power Meter Information" and "Rule Setting" pages. For single-phase power meter, the user could give nicknames to the CT1/CT2/ CT3/CT4.
- ◆ DO Attribute：
  - ■ Nickname：For user to define nicknames for each DO channel, this nickname will be displayed on the"Power Meter Information" and "Rule Setting" pages.
  - ■ Power On Value: Set up the initial value for the DO channels when the power meter is powered on.

After all settings are completed, click "OK" button to return to the Power Meter List.

7.1.6 Modbus TCP Powe Meter Setting

PMC-5151 support ICP DAS Single-phase Modbus TCP Powe Meters, the following section will give more detailed settings of the power meter setting page. (Using PM-3144-MTCP as an example):

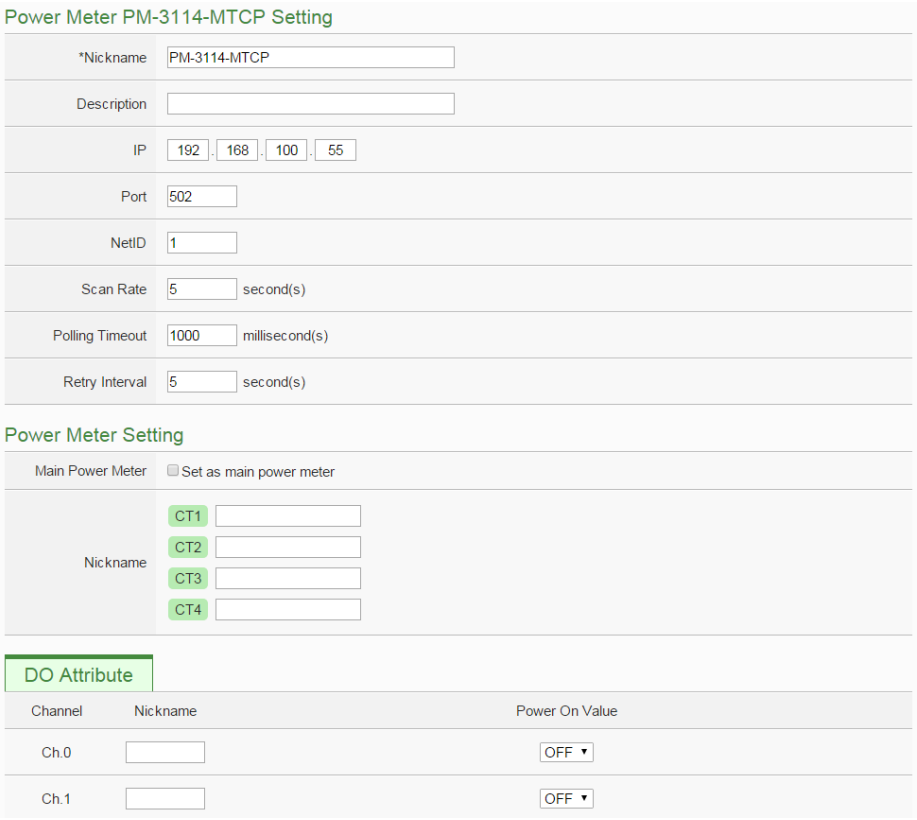


Figure7-17 : PM-3114-MTCP Setting Page

The settings are as follow:

- Nickname：For user to define nicknames for each power meter, this nickname will be displayed on the “Power Meter Information” and “Rule Setting” pages.
- Description: The Description field provides a space for the user to make a brief description of this power meter.
- IP: The address will be the IP address of this power meter, please make sure the IP address setting is the same as the settings of the module, if the setting is not accurate, the connection for PMC-5151 to the power meter will be failed.
- Port: The setting will be the Port number of this power meter, please make sure the Port number is the same as the settings of the module, if the setting is not accurate, the connection for PMC-5151 to the power meter will be failed.
- NetID: The setting will be the NetID of this power meter, please make sure the NetID is the same as the settings of the module,

if the setting is not accurate, the connection for PMC-5151 to the power meter will be failed.

- Scan Rate: Input the time interval for PMC-5151 to periodically retrieve the power data of this Modbus TCP Power Meter, the setting range will be 0 ~ 65535 seconds.
- Polling Timeout: The time interval for PMC-5151 to send command to the Modbus TCP Power Meter and wait for the response, the unit will be ms. The setting range will be 1-10000 ms.
- Retry Interval: The time interval to wait for PMC-5151 to repeatedly send command again when PMC-5151 sends command to the Modbus TCP Power Meter and get no response. The unit will be second. the setting range will be 3 ~ 65535 seconds.
- Main Power Meter: When the "Set as main power meter" is selected, this power meter will be set as main power meter and the power data of this meter will be displayed on the Main Power Meter area on the "Power Data Overview" page.
- CT/Phase Nickname: For user to define nicknames for each CT (or phase), this nickname will be displayed on the "Power Meter Information" and "Rule Setting" pages. For single-phase power meter, the user could give nicknames to the CT1/ CT2/ CT3/ CT4.
- DO Attribute：
  - ◆ Nickname：For user to define nicknames for each DO channel, this nickname will be displayed on the"Power Meter Information" and "Rule Setting" pages.
  - ◆ Power On Value: Set up the initial value for the DO channels when the power meter is powered on.

After all settings are completed, click "OK" button to return to the Power Meter List.

7.2 XW-Board Setting

XW-Board Setting page allows the user to set up the configuration of the 5 XW-Boards (XW107, XW110, XW304, XW310 and XW310C) that are connected to the PMC-5151. The XW-Board Setting page is shown as follow:

Please note: Each time PMC-5151 is allowed to connect to one XW-Board module only.

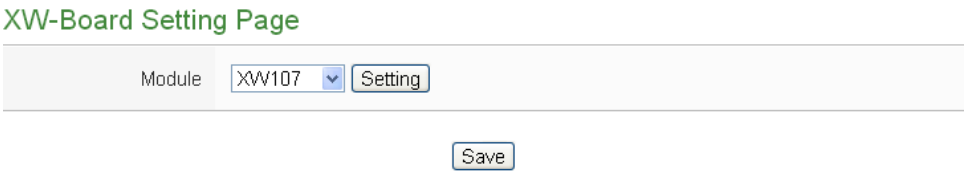


Figure7-18 : XW-Board Setting Page

Select the XW-Board that are connected to the PMC-5151 from the drop down list and click "Setting", a window for setting up the parameters of XW-Board and its I/O channel will appear. The setting for the module is shown as below:

- Nickname: For user to define a nickname for the module, this nickname will be displayed on the "I/O Information" and "Rule Setting" pages.
- Description: The Description field provides a space for the user to make a brief description of this XW-Board.

The following section will introduce the DI, DO, AI and AO channel settings of the XW-Board. After all settings are completed, click "Save" button to save the changes.

7.2.1 XW-Board DI Channel Settings

The XW-Board DI Channel Setting page is shown as follow (using XW107 as an example):

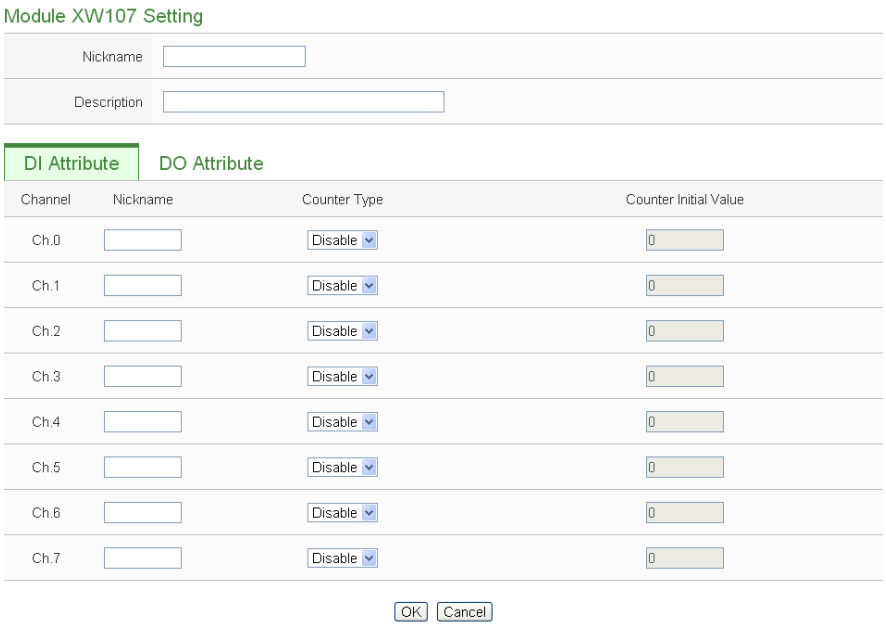


Figure7-19 : XW-Board DI attribute setting page

The settings are as follow:

- Nickname：For user to define nicknames for each I/O channel, this nickname will be displayed on the “I/O Information” and “Rule Setting” pages.
- Counter Type：Specify the counter type to be “Falling” (ON-to-OFF) or “Rising” (OFF-to-ON); if you select “Disable” indicates that the counter of this DI channel will not function.
- Counter Initial Value：Set the initial value of the counter in the “Counter Initial Value” field. This counter will start counting from the initial count value. The default initial value is 0.

After the DI channel settings are completed, continue to perform settings of other channels, after all settings are completed click “Save” button to save the changes and return to XW-Board Setting page.

7.2.2 XW-Board DO Channel Settings

The XW-Board DO Channel Setting page is shown as follow (using XW107 as an example):

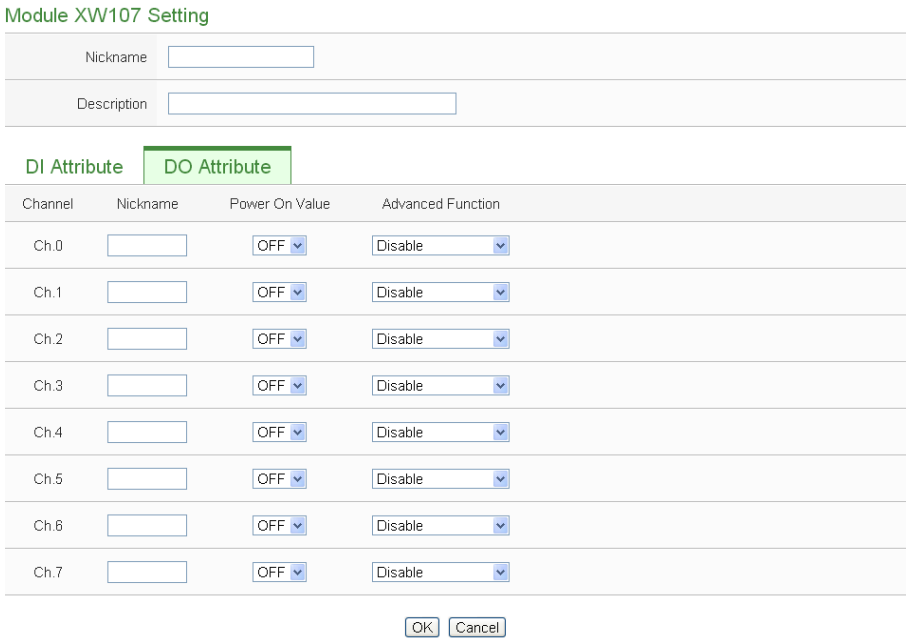


Figure7-20 : XW-Board DO attribute setting page

The settings are as follow:

- Nickname：For user to define nicknames for each I/O channel, this nickname will be displayed on the “I/O Information” and “Rule Setting” pages.
- Power On Value: Specify the initial status to be “ON” or to be “OFF” when PMC-5151 power on. Select the value from the dropdown list of “Power On Value” field. The default value is “OFF”.
- PMC-5151 provides 3 advanced functions, select the function from the dropdown list:
  - Pulse Output: If the Pulse Output is selected, it will allow this DO channel to perform pulse output and form a periodic pulse cycle. In Pulse Output mode, the selected DO channel will generate a square wave according to specified parameters (Pulse High and Pulse Low). Pulse High indicates the “ON” time duration and Pulse Low indicates the “OFF” time duration in a periodic Pulse cycle. The unit is 100ms.
  - Auto OFF: When “Auto OFF” is selected, it allows this DO channel to enable Auto OFF function. It is required to set up a time interval, when this DO channel is set to be “ON” and the duration of the ON status reaches the pre-set time interval , the DO will automatically be set to OFF. The unit is second.

- DI Status Mapping: When “DI Status Mapping” is selected, the status of the DI channel with the same channel number on the XW-Board will be copied to the DO channel. For example, when the “DI Status Mapping” is enabled on DO0, when the DI0 status is ON, DO0 will set to be ON, and when the DI0 status is OFF, DO0 will set to be OFF as well.

After all settings of the channels are completed, click “OK” button to return to XW-Board Setting page.

7.2.3 XW-Board AI Channel Settings

The XW-Board AI Channel Setting page is shown as follow (using XW310C as an example):

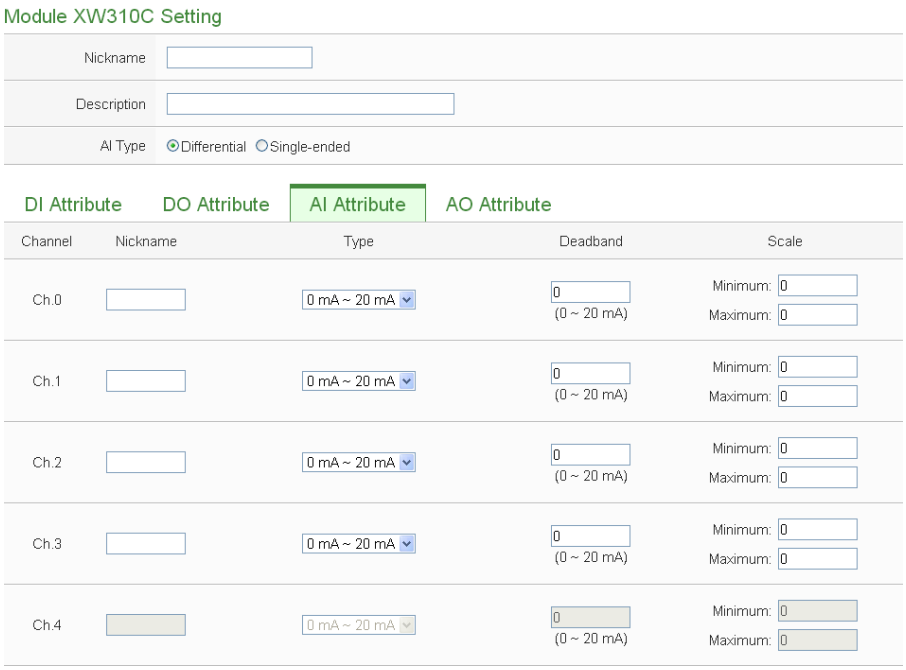


Figure7-21 : XW-Board AI attribute setting page

The settings are as follow:

- Nickname：For user to define nicknames for each I/O channel, this nickname will be displayed on the “I/O Information” and “Rule Setting” pages.
- Type: Select the input signal type of the AI channel from the dropdown list.
- Scale: In the “Scale” field, AI channel raw data can be set to operate with linear proportion between “MIN” and “MAX” values.

The IF Condition will use this already-adjusted value in the evaluation operation, and the AI value retrieved from the "I/O Information" page or Modbus Table via PMC-5151 would be the adjusted value. The default value for MAX and MIN is 0, it means the Scale function is disabled.

- Deadband: In order to avoid signal oscillation that may result in instability to the measurement of the AI channel value or system operations, the user can set up a Deadband value for the AI channel to reduce the oscillation effect to the channel value. The detailed description of Deadband operation is as below:

  There are three operation styles for AI Deadband. The AI Channel setting in following examples is 0mA ~ 20mA.

  (a) In the IF Condition, when AI > or >= a numerical value:

  Assuming the Deadband value is set to be 2 mA, and the following statements are defined in the related logic Rule: IF AI>10mA, THEN DO=ON, ELSE DO=OFF, that means, when AI receives a signal that exceed 10mA, the DO channel will change to ON immediately, however, when the AI channel value drops and becomes lower than 10mA, the DO channel will not change back to OFF immediately until the value reaches 8mA (10mA minus the Deadband value 2mA), as shown in the following figure.

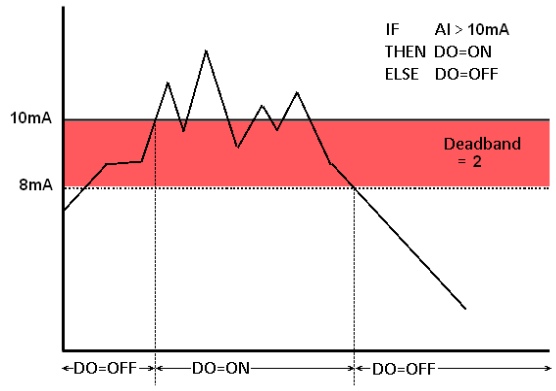


Figure7-22 : AI Deadband Operation(> or >= a numerical value)

  (b) In the IF Condition, when AI < or <= a numerical value:

  Assuming the Deadband value is set to be 2 mA, and the following statements are defined in the related logic Rule: IF

AI<10mA, THEN DO=ON, ELSE DO=OFF, that means, when AI receives a signal which is lower than 10mA, the DO channel will change to ON immediately, however, when the AI channel value exceed 10mA, the DO channel will not change back to OFF immediately until the value reaches 12mA (10mA plus the Deadband value 2mA), as shown in the following figure.

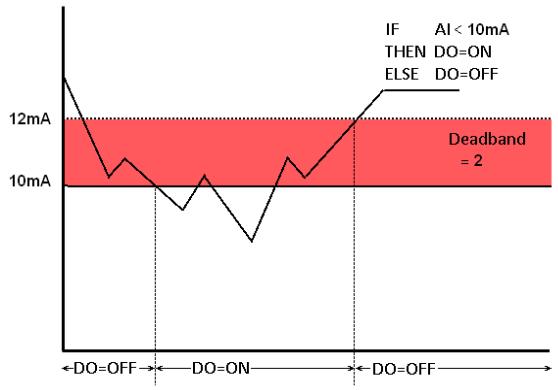


Figure7-23 : AI Deadband Operation(< or <= a numerical value)

(c) In the IF Condition, when AI = a numerical value:

Assuming the Deadband value is set to be 1 mA, and the following statements are defined in the related logic Rule: IF AI = 9mA, THEN DO=ON, ELSE DO=OFF, that means, when AI receives a signal between 8mA (9mA minus the deadband value 1mA) and 10mA (9mA plus the deadband value 1mA), the DO channel will change to ON immediately. However, when the AI channel value exceed 10mA, or is lower than 8mA, the DO channel will change to OFF, as shown in the following figure.

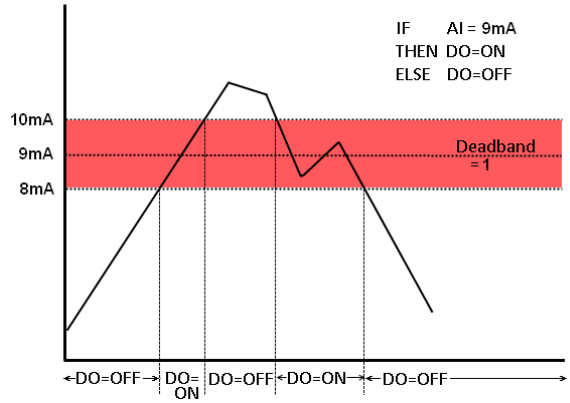


Figure7-24 : AI Deadband Operation(= a numerical value)

After all settings of the channels are completed, click “OK” button to return to XW-Board Setting page.

Please Note: XW-310C supports two AI type: Differential and Single-ended. When the “Differential” is selected, the number of the AI channels will be 4, and when the “Single-ended” is selected, the number of the AI channels will be 8. To complete the settings, in addition to specifying the AI type on the PMC-5151 web page, it also required to adjust the jumper on the XW310C, for more detailed information about jumper adjustment on XW310C, please refer to Appendix 5.

7.2.4 XW-Board AO Channel Settings

The XW-Board AO Channel Setting page is shown as follow (using XW304 as an example):

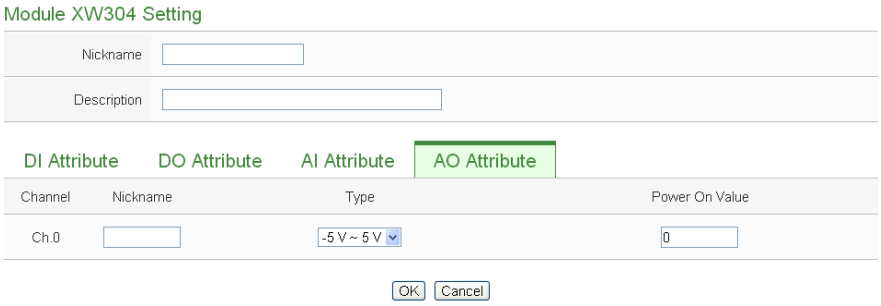


Figure7-25 : XW-Board AO attribute setting page

The settings are as follow:

- Nickname：For user to define nicknames for each I/O channel, this nickname will be displayed on the “I/O Information” and “Rule Setting” pages.
- Type: Select the output signal type of the AO channel from the dropdown list.
- Power On Value: You can set the initial value of the AO channel in the “Power On Value” field. The default initial value is 0.

After all settings of the channels are completed, click “OK” button to return to XW-Board Setting page.

7.3 I/O Module Setting

PMC-5151 allows connections to ICP DAS M-7000 modules. It also supports standard Modbus RTU or Modbus TCP I/O modules. The I/O Module Setting page allows user to add Modbus RTU or Modbus TCP I/O modules that are connected to the PMC-5151 to the list. After the module is added, it allows to set up the configuration of the I/O module. The setting page is shown as below:

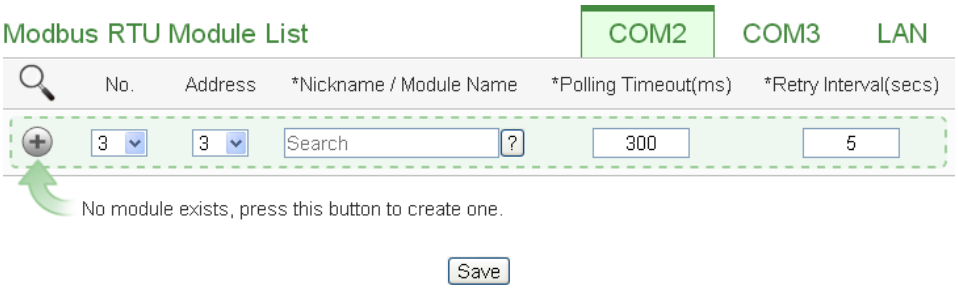


Figure7-26 : I/O Module Setting Page

The following section will give more information how to add and complete settings of Modbus RTU I/O modules and Modbus TCP I/O modules. After all settings are completed, click "Save" button to save the changes.

Please Note:

1. The COM2 (RS-485) and COM3 (RS-485) interfaces on PMC-5151 allows connections to Modbus RTU I/O modules.
2. The LAN interface on PMC-5151 allows connections to Modbus TCP I/O modules. For more detailed information of the LAN settings, please refer to "6.4 I/O Interface Setting".
3. One PMC-5151 allows connections to at most 8 Modbus I/O modules (including M-7000 modules, Modbus RTU I/O modules and Modbus TCP I/O modules.)
4. A single I/O interface (COM2, COM3 or LAN) allows connections to at most 16 devices (Power meters and I/O modules); each device requires its own index number. Therefore, if an I/O interface is connecting to both power meters and I/O modules, they will share the same set of the index numbers. For example, if COM2 is connecting to 2 Modbus RTU power meters and already takes the index numbers No.1 and No.2, the Modbus RTU I/O modules that are going to be connected to COM2 can be only set as No.3 ~ No.16 that are not occupied.

7.3.1 Scan to Add ICP DAS M-7000 Modules

The user could use Scan function to add ICP DAS M-7000 Modules to the PMC-5151, the steps are as below:

i Click on button to scan the M-7000 modules that are connected to the PMC-5151.

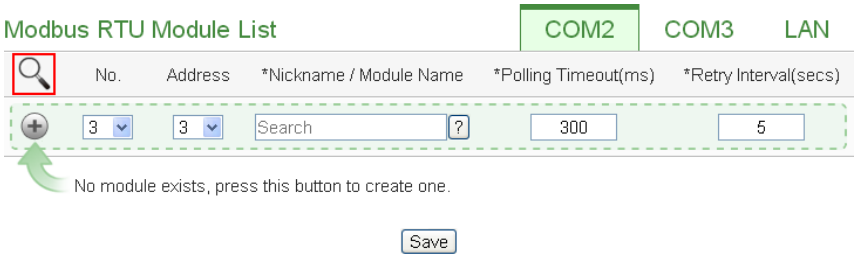


Figure7-27 : The "Scan" button to search M-7000 module

ii When the Scan page appears (Figure 7-28), input the starting address and the ending address of the Modbus address that are going to perform scan. Click on "Scan", the system will start to scan the M-7000 modules that match the settings previously set, to cancel the scan, click on "Cancel".

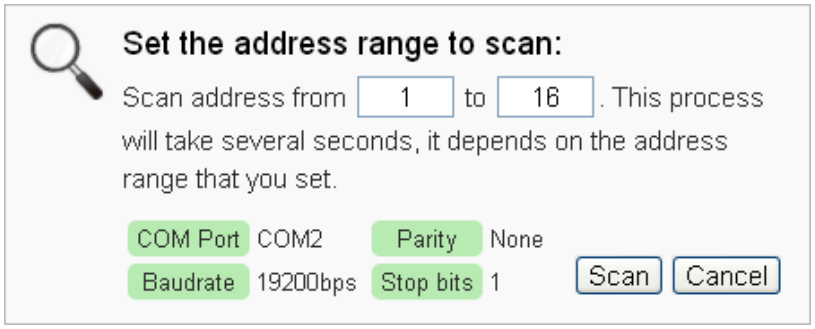

Set the address range to scan:
Scan address from 1 to 16 . This process will take several seconds, it depends on the address range that you set.
COM Port COM2
Parity None
Baudrate 19200bps
Stop bits 1
Scan
Cancel

Figure7-28 : Set up the Scanning Range for the M-7000 module

iii When the system is performing the scan (Figure 7-29), the address that are performing scan will be dynamically shown on the upper left side, please wait till the scan operation is completed. To stop the scan operation, click on "Cancel" to terminal the scan and leave the page.

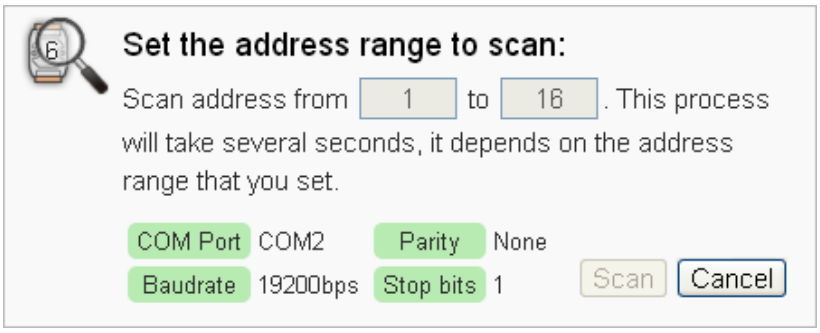

Set the address range to scan:
Scan address from 1 to 16 . This process will take several seconds, it depends on the address range that you set.
COM Port COM2
Parity None
Baudrate 19200bps
Stop bits 1
Scan
Cancel

Figure7-29 : Scaning the M-7000 modules

iv After the Scan operation is completed, an M-7000 module list will appear (Figure 7-30). If the newly scaned module doesn't match the module previously set on the same address, a window will appear (Figure 7-31), please select the actual device that are connected to PMC-5151. After all settings are completed, click "Save" button to save the changes.

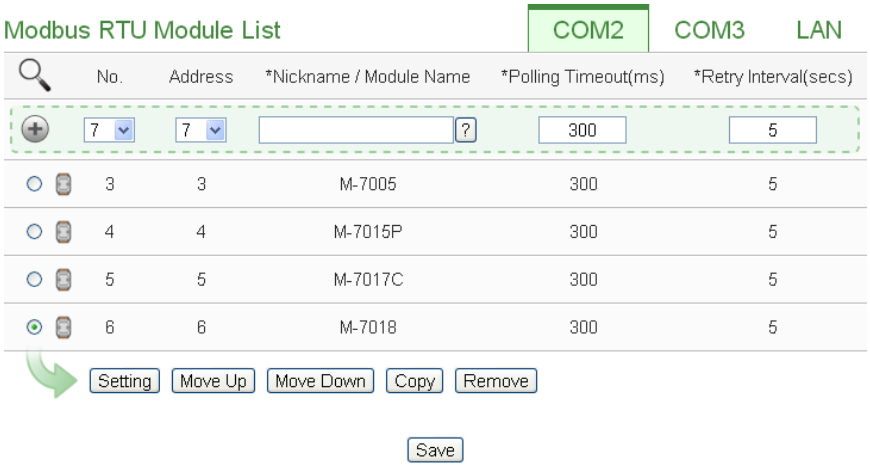


Figure7-30 : The M-7000 List after Scan operation

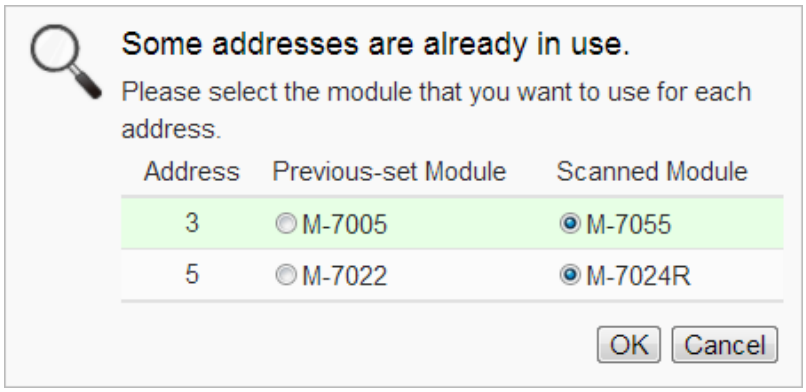


Figure7-31 : Select the actual M-7000 modules connected to PMC-5151

7.3.2 Add Modbus RTU Module (or M-7000 Module) manually

In addition to perform Scan operation to automatically add M-7000 modules to the list, the user could also add the Modbus RTU module (or M-7000 module) manually one by one, the steps are as below:

i No: The number will be the order that the I/O channel data of the Modbus RTU module being stored in the PMC-5151 Modbus Table. The range is 1~16.

ii Address: The address will be the Modbus address of this Modbus RTU module, please make sure the address is the same as the settings of the module, if the setting is not accurate, the connection for PMC-5151 to the Modbus RTU module will be failed.

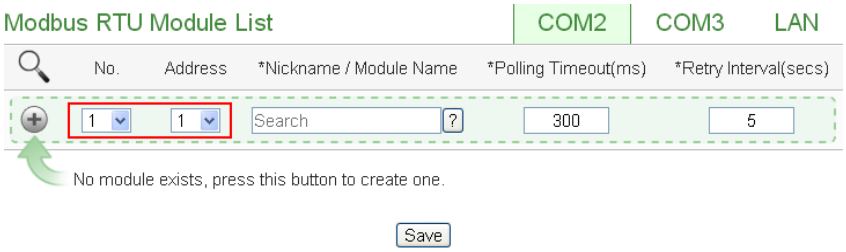


Figure7-32 : Set up the No and Address of the Modbus RTU module

iii Select the module name: For ICP DAS M-7000 modules, the user could select the default model name from the dropdown list for further modification. For other Modbus RTU module (non M-7000 module), please input the module name.

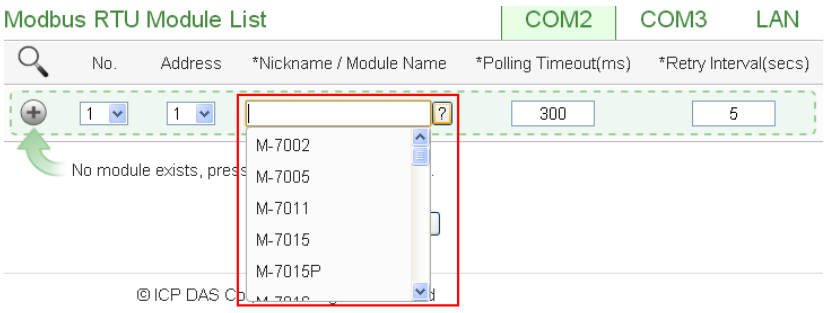


Figure7-33 : Select the model of the Modbus RTU Module

iv Polling Timeout: The time interval for PMC-5151 to send command to the Modbus RTU module and wait for the response, the unit will be ms. The setting range will be 1-10000 ms.

v Retry Interval: The time interval to wait for PMC-5151 to repeatedly send command again when PMC-5151 sends command to the

Modbus RTU module and get no response. The unit will be second. the setting range will be 3 ~ 65535 seconds.

vi Click ⊕ to add the Modbus RTU module to the list (Figure 7-34). After adding the Modbus RTU module, click “Save” button to save the changes.

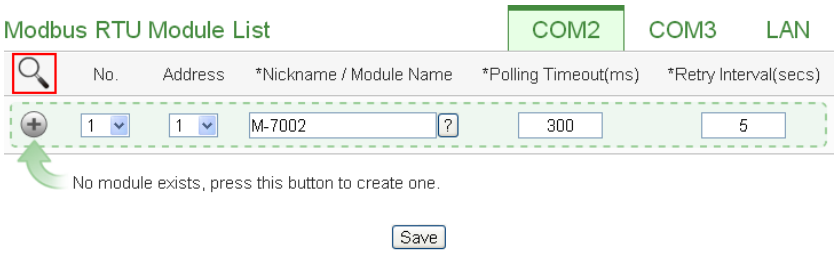


Figure7-34 : Add the Modbus RTU Module mannually

7.3.3 Add Modbus TCP Module manually

To manually add Modbus TCP modules, please follow the steps below:

i No: The number will be the order that the I/O channel data of the Modbus TCP module being stored in the PMC-5151 Modbus Table. The range is 1~16.

ii Network: Set up the settings of IP, Port and NetID appropriately as required. If the settings are not the same as the settings of the module, the connection for PMC-5151 to the Modbus TCP module will be failed.

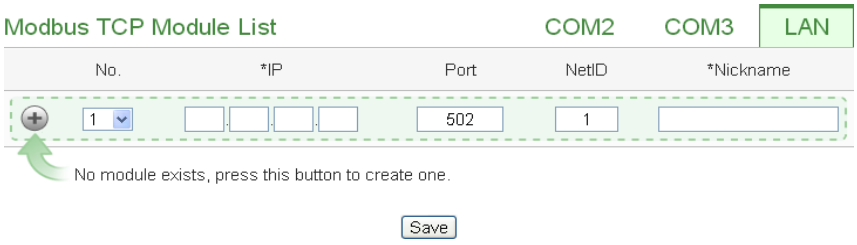


Figure7-35 : Add Modbus TCP Module

iii Nickname：For user to define nicknames for the Modbus TCP module, this nickname will be displayed on the “Module Information” pages.

iv Click ⊕ to add the Modbus TCP module to the list (Figure 7-36). After adding the module, click “Save” button to save the changes.

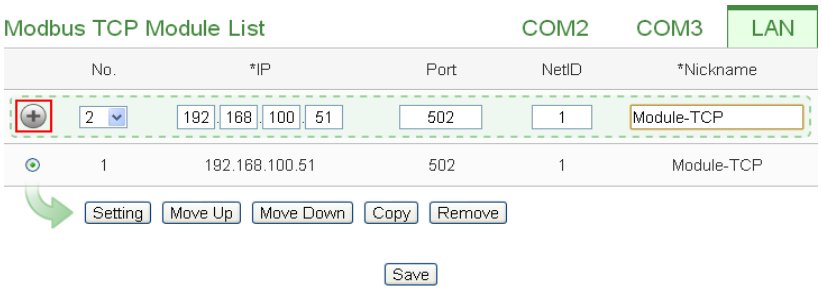


Figure7-36 : Add the Modbus RTU Power Meter mannually

7.3.4 I/O Module List Interface

After the Modbus RTU I/O module or Modbus TCP I/O module are added to the I/O Module list via auto scan or manual work, the Modbus RTU I/O modules and Modbus TCP I/O modules will be listed as below:

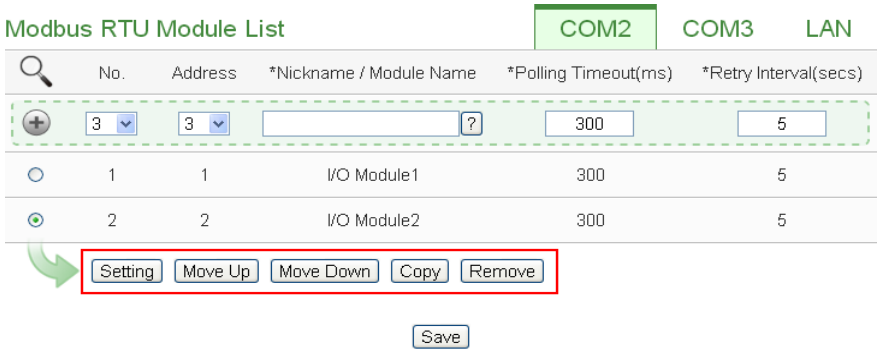


Figure7-37 : Modbus module List Interface

The following functions allow to perform settings or rearrange order of the Modbus I/O modules. Please select the Modbus I/O module and click on the function button to perform the operations:

- Setting: Click the radio button in front of the Modbus I/O module and click on “Setting” to get into the setting page of the Modbus I/O module. The settings for each Modbus I/O module will be given in the following section.
- Move Up: Click the radio button in front of the Modbus I/O module and click on “Move Up” to move the Modbus I/O module to upper order (upper index number (No)).
- Move Down: Click the radio button in front of the Modbus I/O module and click on “Move Down” to move the Modbus I/O module to lower order (lower index number (No)).
- Copy: To copy the settings of a pre-set Modbus I/O module to the new Modbus I/O module, please click the radio button in

front of the pre-set Modbus I/O module and then click on "Copy", a new Modbus I/O module (in sequence) will be added to the list and the settings of the old Modbus I/O module will be copied to this newly added Modbus I/O module.

- Remove: Click the radio button in front of the Modbus I/O module and click on "Remove" to remove the selected Modbus I/O module.

After all settings are completed, click "Save" button to save the changes.

7.3.5 M-7000 Module Setting

PMC-5151 support ICP DAS M-7000 module, the following section will give more detailed settings of ICP DAS M-7000 module setting page. (Figure 7-38)

- Nickname：For user to define nicknames for each M-7000 module, this nickname will be displayed on the "I/O Information " and "Rule Setting" pages.
- Description: The Description field provides a space for the user to make a brief description of this M-7000 module.
- Address: The address will be the Modbus address of this M-7000 module, please make sure the address is the same as the settings of the module, if the setting is not accurate, the connection for PMC-5151 to the M-7000 module will be failed.
- Scan Rate: Input the time interval for PMC-5151 to periodically retrieve the I/O channel data of this M-7000 module, the setting range will be 0 ~ 65535 seconds.
- Polling Timeout: The time interval for PMC-5151 to send command to the M-7000 module and wait for the response, the unit will be ms. The setting range will be 1-10000 ms.
- Retry Interval: The time interval to wait for PMC-5151 to repeatedly send command again when PMC-5151 sends command to the M-7000 module and get no response. The unit will be second. the setting range will be 3 ~ 65535 seconds.

The settings interfaces of the DI, DO, AI and AO channels on the M-7000 Module are as below:

- The DI channel setting for M-7000 module

The M-7000 module DI channel setting interface is shown as below (using M-7052 as an example)

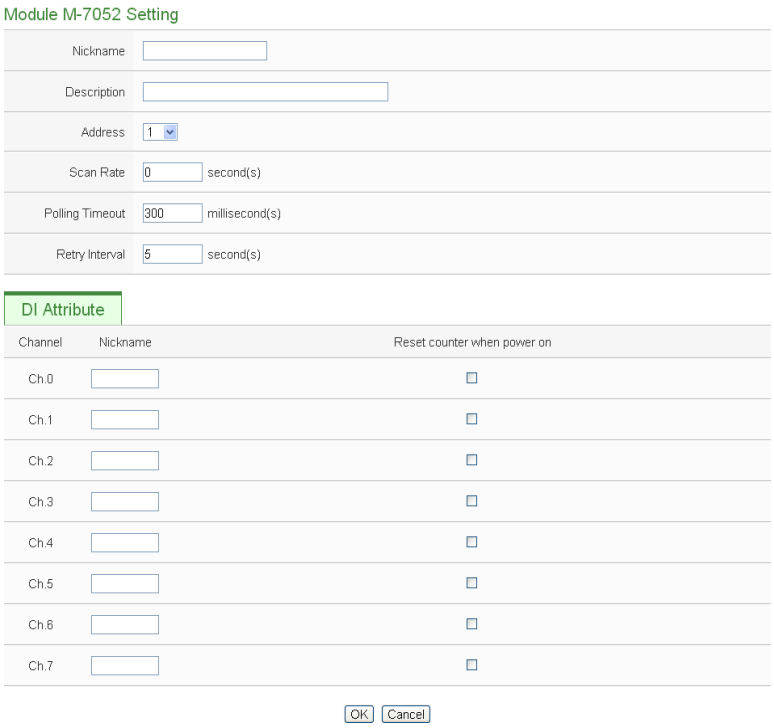


Figure7-38 : M-7000 DI Channel Setting Page

The settings are as below:

◆ Nickname：For user to define nickname for each I/O channel, this nickname will be displayed on the “I/O Information” and “Rule Setting” pages.

◆ Reset counter when power on: If the “Reset counter when power on” is selected for the DI channel, the DI channel counter of this M-7000 module will be reset to the default value when the PMC-5151 is powered on or after loading the rules.

After all settings of the DI channels are completed, continue the configuration of other channel, and after all channel settings are completed, click “OK” button to save the changes and return to Modbus RTU Module List.

Please Note:

1. For M-7000 modules, the counting mode of the DI channel counter is Falling.
2. To set up the default value of the DI channels on M-7000 modules, please use DCON Utility to set the value.

- The DO channel setting for M-7000 module

The M-7000 module DO channel setting interface is shown as below (using M-7060 as an example)

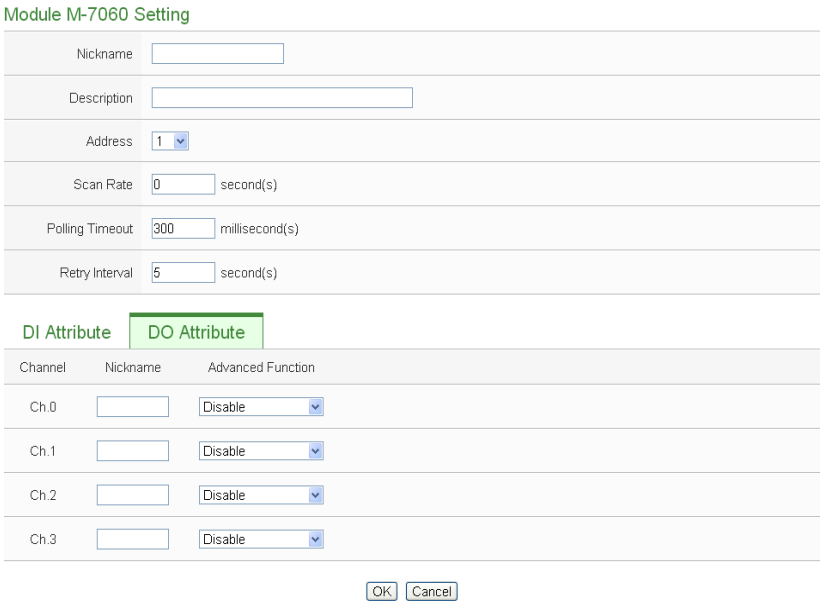


Figure7-39 : M-7000 DO Channel Setting Page

The settings are as below:

- ◆ Nickname：For user to define nickname for each I/O channel, this nickname will be displayed on the “I/O Information” and “Rule Setting” pages.
- ◆ For M-7000 DO channels, PMC-5151 provides the following options for advanced function:
  - ■ Disable: Disable the advanced function
  - ■ Auto OFF: When “Auto OFF” is selected, it allows this DO channel to enable Auto OFF function. It is required to set up a time interval, when this DO channel is set to be “ON” and the duration of the ON status reaches the pre-set time interval , the DO will automatically be set to OFF. The unit is second.
  - ■ DI Status Mapping: When “DI Status Mapping” is selected, the status of the DI channel with the same channel number on the M-7000 module will be copied to the DO channel. For example, when the “DI Status Mapping” is enabled on DO0, when the DI0 status is ON, DO0 will set to be ON, and when the DI0 status is OFF, DO0 will set to be OFF as well.

After all settings are completed, click “OK” button to save the

changes and return to Modbus RTU Module List.

Please Note:

1. To set up the Power On value of the DO channels on M-7000 modules, please use DCON Utility to set the value.
2. The DO channels on M-7000 modules do not offer Pulse Output function.

- The AI channel setting for M-7000 module

The M-7000 module AI channel setting interface is shown as below (using M-7018 as an example)

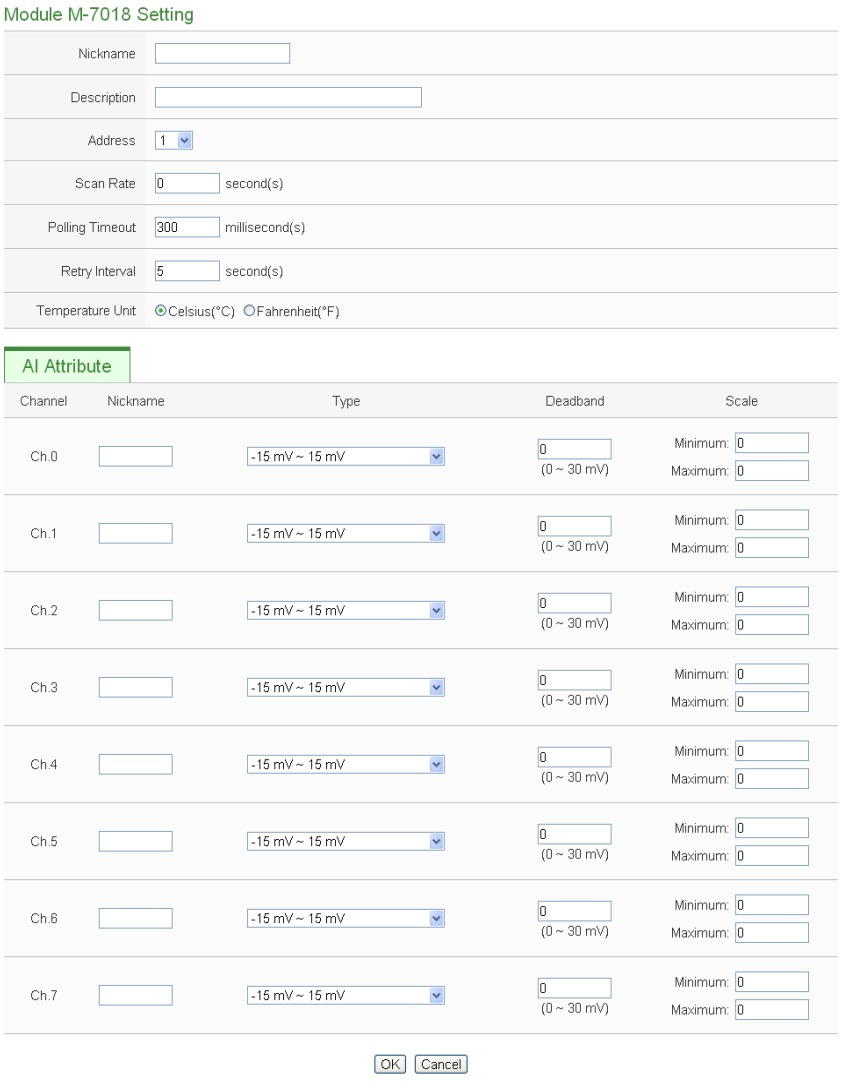


Figure7-40 : M-7000 AI Channel Setting Page

The settings are as below:

◆ Nickname：For user to define nickname for each I/O channel, this nickname will be displayed on the “I/O Information” and

"Rule Setting" pages.

◆ Type: Select the input signal type of the AI channel from the dropdown list.

◆ Deadband: Please refer to Deadband section in the "7.2.3 XW-Board AI Channel Settings" for more detailed information.

◆ Scale: Please refer to Scale section in the "7.2.3 XW-Board AI Channel Settings" for more detailed information.

After all settings are completed, click "OK" button to save the changes and return to Modbus RTU Module List.

- The AO channel setting for M-7000 module

The M-7000 module AO channel setting interface is shown as below (using M-7024 as an example)

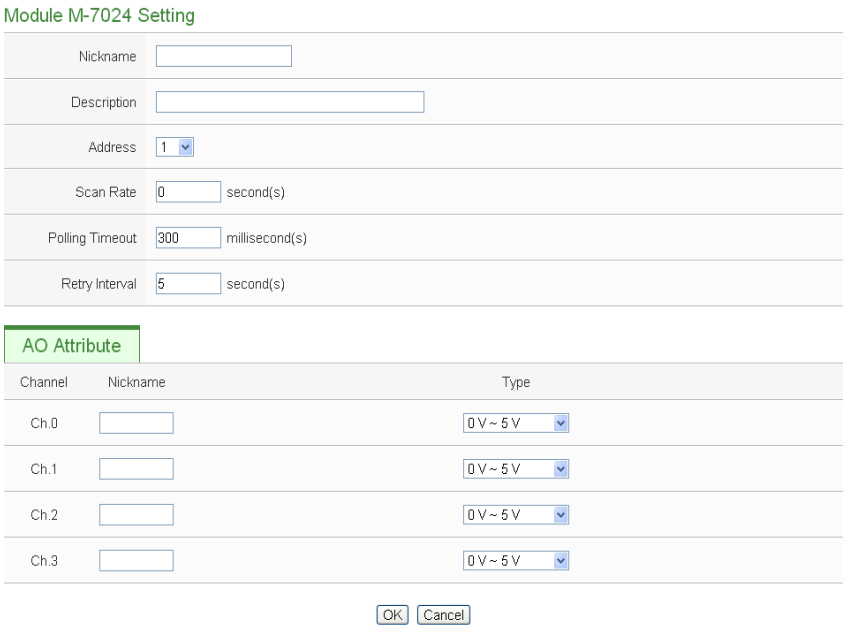


Figure7-41 : M-7000 AO Channel Setting Page

The settings are as below:

◆ Nickname：For user to define nickname for each I/O channel, this nickname will be displayed on the "I/O Information" and "Rule Setting" pages.

◆ Type: Select the output signal type of the AO channel from the dropdown list.

After all settings are completed, click "OK" button to save the

changes and return to Modbus RTU Module List.

Please note: To set up the Power On value of the AO channels on M-7000 modules, please use DCON Utility to set the value.

7.3.6 Modbus RTU Module Setting

PMC-5151 allows connections to modules that support Modbus RTU Slave protocol for offering I/O interface function. Through Modbus RTU protocol, it enables to read or write 4 types of Modbus data (Coil Output, Discrete Input, Input Register and Holding Register) from the Modbus RTU Slave modules. And by PMC-5151 IF-THEN-ELSE rule engine, it allows to perform automation control operation on the modules. And with SCADA software, it also allows monitoring and control of the Modbus RTU modules which connect with the PMC-5151. The Modbus RTU Slave Module setting page is shown as follow:

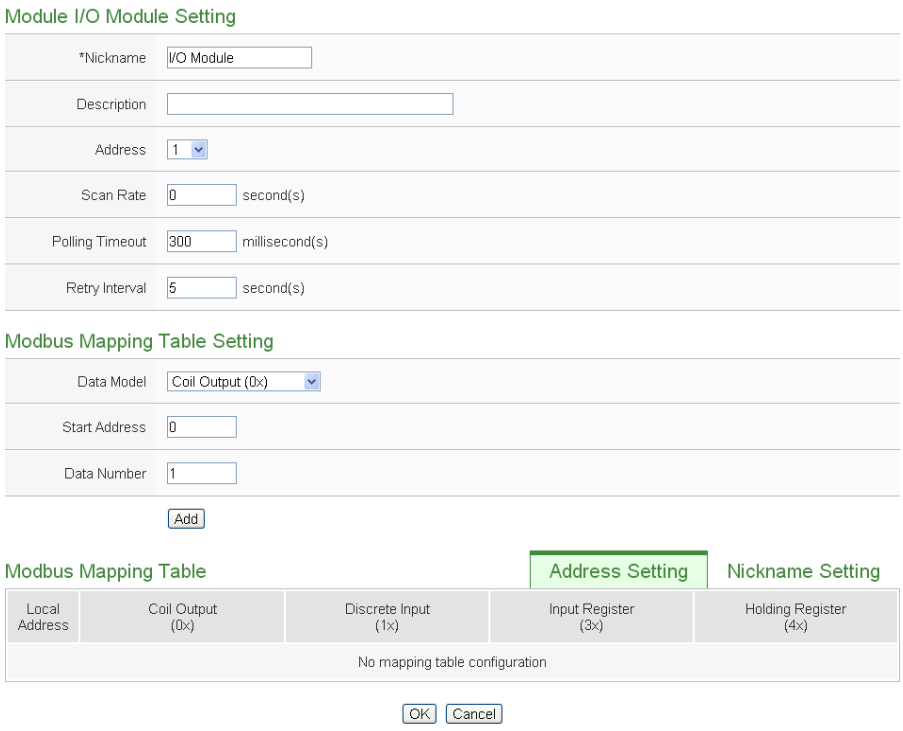


Figure7-42 : Modbus RTU Slave Module Setting Page

The settings are as below:

- Nickname：For user to define nickname for each I/O channel, this nickname will be displayed on the “I/O Information” and “Rule Setting” pages.
- Description: The Description field provides a space for the user to

make a brief description of this module.

- Address: The address will be the Modbus address of this Modbus RTU module, please make sure the address is the same as the settings of the module, if the setting is not accurate, the connection for PMC-5151 to the Modbus RTU module will be failed.
- Scan Rate: Input the time interval for PMC-5151 to periodically retrieve the I/O channel data of this Modbus RTU module, the setting range will be 0 ~ 65535 seconds.
- Polling Timeout: The time interval for PMC-5151 to send command to the Modbus RTU module and wait for the response, the unit will be ms. The setting range will be 1-10000 ms.
- Retry Interval: The time interval to wait for PMC-5151 to repeatedly send command again when PMC-5151 sends command to the Modbus RTU module and get no response. The unit will be second. The setting range will be 3 ~ 65535 seconds.

After all settings are completed, click “Save” button to save the changes.

Please refer to the following sections for more detailed information of Coil Output, Discrete Input, Input Register and Holding Register configurations on Modbus RTU Slave module.

Please Note: The number of Modbus address setting blocks will affect the data update rate for the Modbus RTU Slave module. Please minimize the number of Modbus address setting blocks; merge the conjunctive setting blocks to speed up the data update rate for the communication between PMC-5151 and Modbus RTU Slave module.

- The Coil Output Setting of Modbus RTU Module

  The Modbus RTU Module Coil Output Setting page is shown as follow:

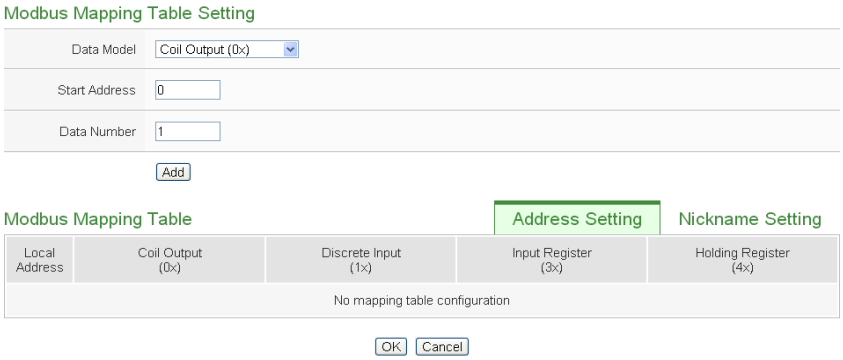


Figure7-43 : Coil Output Setting Page

The settings are as follow:

◆ Data Model: PMC-5151 offers 4 Data Model selections to match the Modbus RTU Slave module configuration. The Data Model list is as follow. In this case, please select ”Coil Output(0x)”.

Data Model	The Modbus Address of Modbus RTU Slave Modules
Coil Output	0xxxx
Discrete Input	1xxxx
Input Register	3xxxx
Holding Register	4xxxx

◆ Start Address: Allows setting up the starting address of Coil Output (0x) on the Modbus RTU Slave module you would like to retrieve.

◆ Data Number: After finishing the Start Address setting, specify the Data Number, it is the number of Coil Output data you would like to retrieve from the Start Address.

◆ After finishing the “Start Address” and “Data Number” setting, click on “Add” button. A new Coil Output address block will be added to the Modbus address mapping table. All added address blocks will be located in sequences staring from the Starting Addressof the Coil Output (The address number on the first column of the “Local Address” indecates the local Modbus address of PMC-5151 to keep the Coil Output data.).

Figure7-44 is an example about Coil Output setting for a Modbus RTU Slave module. The starting Modbus address of the Coil Output block is 00050(00000 + 50), it requires to set 4

continuous Coil Output data in the setting. So that the PMC-5151 can access the 00050, 00051, 00052 and 00053 Coil Output address of the module, and these retrieved Coil Output data will be kept in PMC-5151 Modbus Address 00300, 00301, 00302 and 00303.

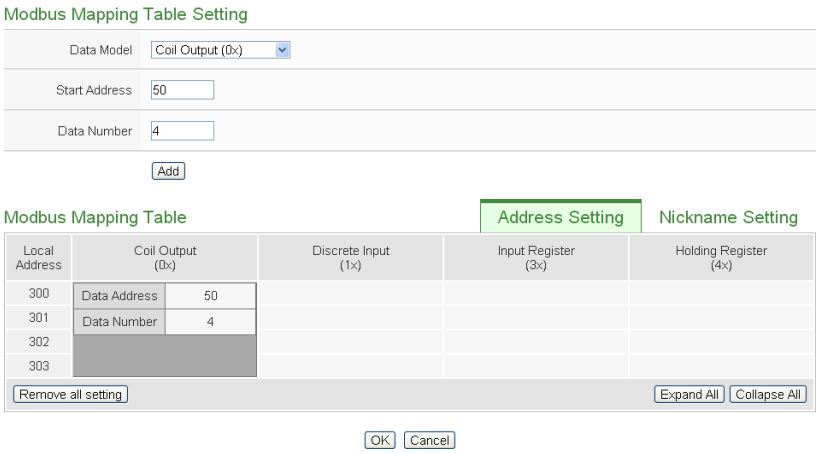
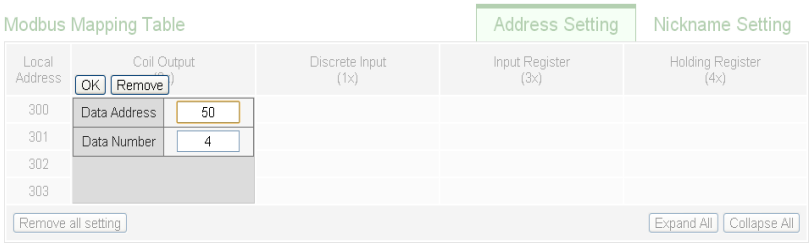
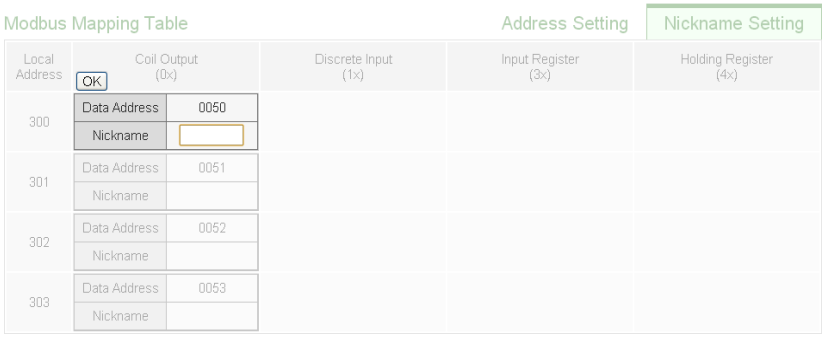


Figure7-44 : Coil Output Setting Example for Modbus RTU Module

◆ To modify the starting address or quantity setting, please click on the setting block and input the setting. Click “OK” for modification or click “Remove” to remove the setting.



◆ If the user wants to assign a Nickname for the address blocks, the user can click on the “Nickname Setting” tab, and then input the Nickname for each address block. The Nickname will be shown in the “I/O Information” and “Rule Setting” pages.



◆ After all Coil Output settings of the Modbus RTU module are completed, click “OK” button to save the changes.

- The Discrete Input Setting of Modbus RTU Module

The Modbus RTU module Discrete Input Setting page is shown as follow:

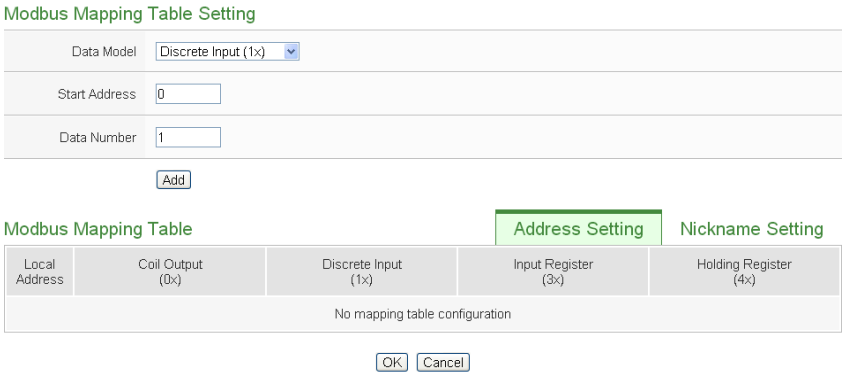


Figure7-45 : Discrete Input Setting Page

The settings are as follow:

◆ Data Model: WISE-580x offers 4 Data Model selections to match the Modbus RTU Slave module configuration. Please refer to the section “The Coil Output Setting of Modbus RTU Module” for detailed information. In this case please select ”Discrete Input(1x)”.

◆ Start Address: Allows to set up the starting address of the data on the PMC-5151 that would be retrieved to the Discrete Input(1x) on the Modbus RTU module.

◆ Data Number: After finishing the Start Address setting, specify the Data Number, it is the number of Discrete Input data that would be retrieved from the Start Address.

◆ After finishing the “Start Address” and “Data Number” setting, click on “Add” button. A new Discrete Input address block will be added to the Modbus address mapping table. All added address blocks will be located in sequences staring from the Starting Address(The address number on the first column of the “Local Address” indecates the local Modbus address of PMC-5151 to keep the Discrete Input data.).

Figure7-46 shows an example about Discrete Input setting for a Modbus RTU module. The starting Modbus address of the Discrete Input block is 10020(10000 + 20), it requires to set 6

continuous Discrete Input data in the setting. So that the PMC-5151 can access the 10020, 10021, 10022, 10023, 10024, and 10025 Discrete Input address of the module, and these retrieved Discrete Input data will be kept in PMC-5151 Modbus Address 10300, 10301, 10302, 10303, 10304 and 10305.

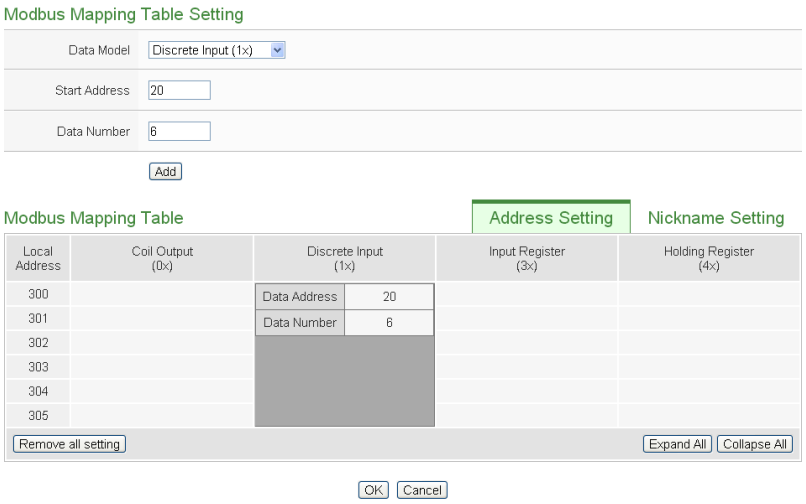
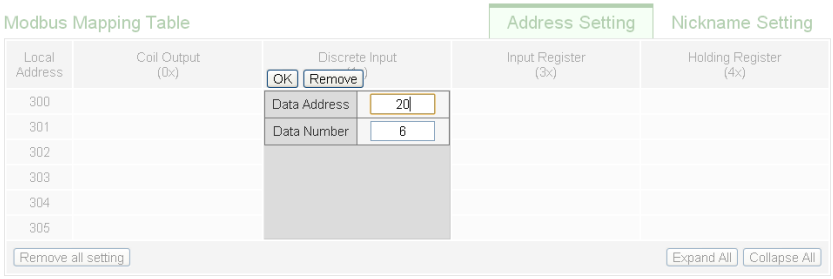
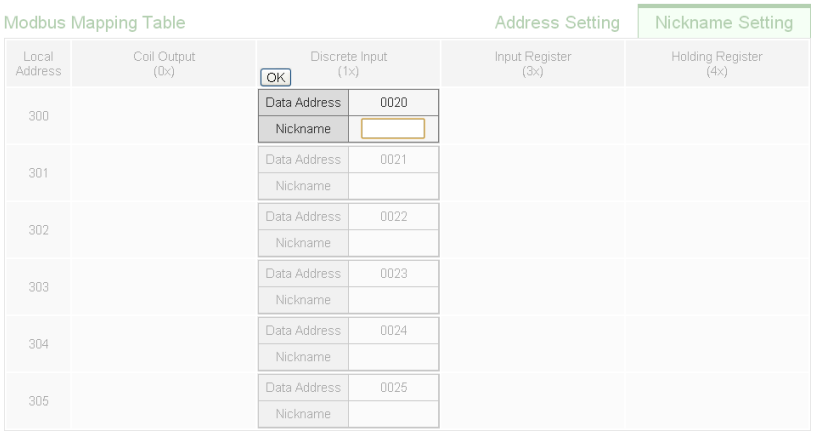


Figure7-46 : Discrete Input Setting Example for Modbus RTU Module

◆ To modify the starting address or quantity setting, please click on the setting block and input the setting. Click “OK” for modification or click “Remove” to remove the setting.



◆ If the user wants to assign a Nickname for the address blocks, the user can click on the “Nickname Setting” tab, and then input the Nickname for each address block. The Nickname will be shown in the “I/O Information” and “Rule Setting” pages.



◆ After all Discrete Input settings of the Modbus RTU module are completed, click “OK” button to save the changes.

- The Input Register Setting of Modbus RTU Module

The Modbus RTU module Input Register Setting page is shown as follow:

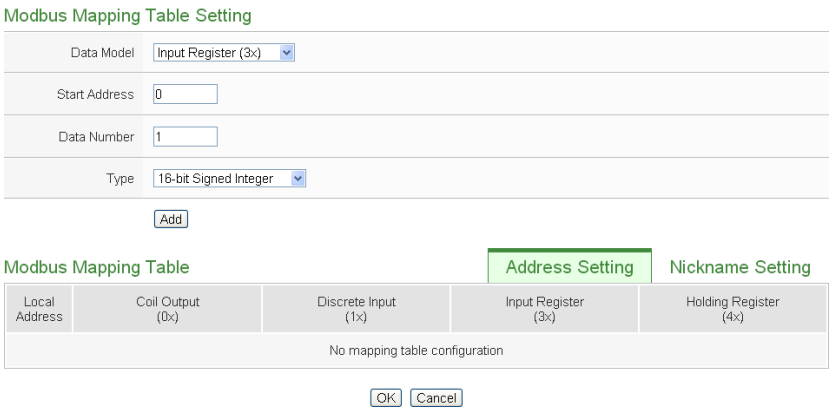


Figure7-47 : Input Register Setting Page

The settings are as below:

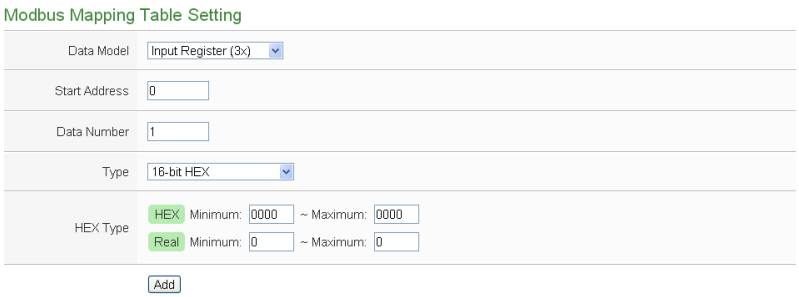
◆ Data Model: WISE-580x offers 4 Data Model selections to match the Modbus RTU Slave module configuration. Please refer to the section “The Coil Output Setting of Modbus RTU Module” for detailed information. In this case please select ”Input Register (3x)”.

◆ Start Address: Allows to set up the starting address of Input Register(3x) on the Modbus RTU module the user would like to retrieve.

◆ Data Number: After finishing the Start Address setting, specify the Data Number, it is the number of Input Register data you

would like to retrieve from the Start Address.

◆ Type: The system support 6 kinds of data type setting for Input Register of Modbus RTU module. The 6 Data Type options are “16-bit Signed Integer”, “16-bit Unsigned Integer”, “16-bit Hex”, “32-bit Signed Long”, “32-bit Unsigned Long”, and “32-bit Floating Point”. If the “16-bit HEX” option is selected, it is required to setup the corresponding scale parameters for linear transformation from HEX value to real value. The PMC-5151 will retrieve the HEX value and transfer it to real value in floating point format, this real value could be included in the IF-THEN-ELSE rule for edition.



If users select “32-bit Signed Long”, “32-bit Unsigned Long”, or “32-bit Floating Point”, the option “Inverse(Big Endian)” will appear. Enable “Inverse(Big Endian)” to receive the data in big endian format correctly.

◆ After finishing the “Start Address”, “Data Number”, and “Type” setting, click on “Add” button. A new Input Register address block will be added to the Modbus address mapping table (shown as below). All added address blocks will be located in sequences staring from the Starting Address (The address number on the first column of the “Local Address” indecates the local Modbus address of PMC-5151 to keep the Input Register data.).

Figure 7-48 shows an example about Input Register setting for a Modbus RTU module. The starting Modbus address of the Input Register block is 30010(30000 + 10), it requires to set 3 continuous Input Register data in the setting, and the data type is “32-bit Floating Point”. So that these retrieved Input Register data will be kept in PMC-5151 Address 30300, 30302, and

30304.

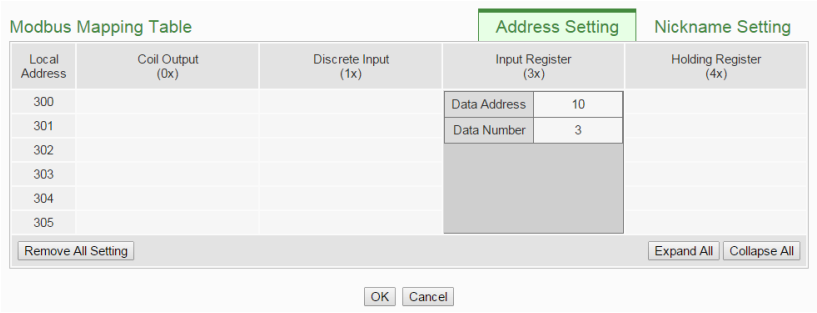


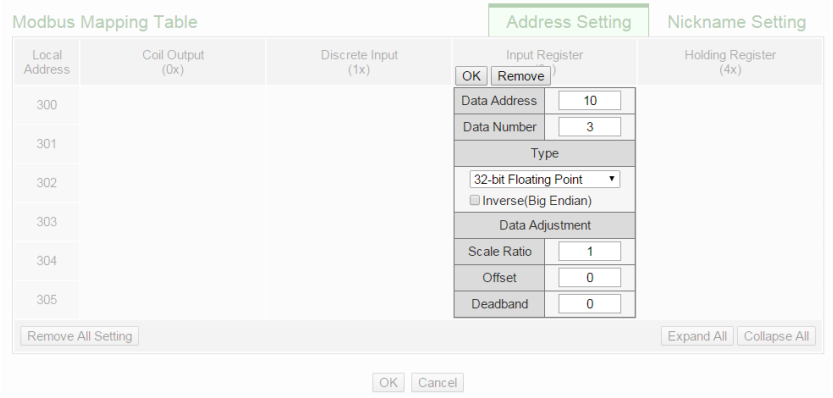
Figure7-48 : Input Register Setting Example for Modbus RTU Module

◆ To modify the starting address or quantity setting, please click on the setting block to perform the modification. The user could also modify Type, Scale Ratio, Offset and Deadband on this interface. The Scale Ratio setting and Offset setting allows user to transform the Input Register value in this block by linear transformation. The formula is as follow:

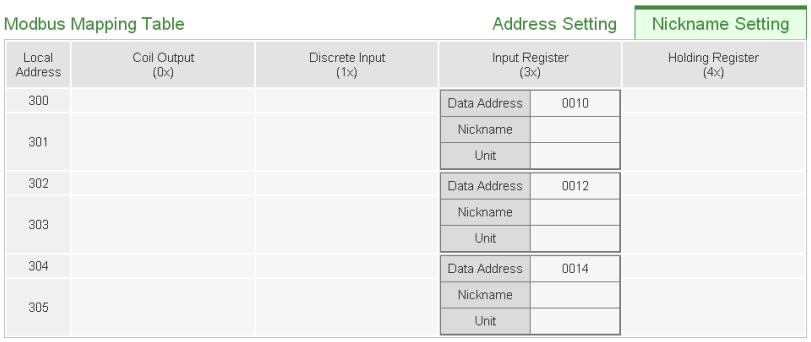
Transformed Value = Scale Ratio x Input Register value + Offset

After the linear transformation, the Transformed Value will be saved in floating point format on the PMC-5151(no matter what format the raw Input Register value was in the device). The default Scale Ratio will be 1 and the default Offset is 0, indicating not using linear transformation.

For more information about Deadband setting, please refer to "7.2.3 XW-Board AI Channel Settings". Click "OK" for modification or click "Remove" to remove the setting.



◆ If the user wants to assign a Nickname for the address blocks, the user can click on the “Nickname Setting” tab, and then input the Nickname for each address block. The Nickname will be shown in the “I/O Information” and “Rule Setting” pages.



◆ After all Input Register settings of the Modbus RTU module are completed, click “OK” button to save the changes.

- The Holding Register Setting of Modbus RTU Module

  The Modbus RTU Slave module Holding Register Setting page is shown as follow:

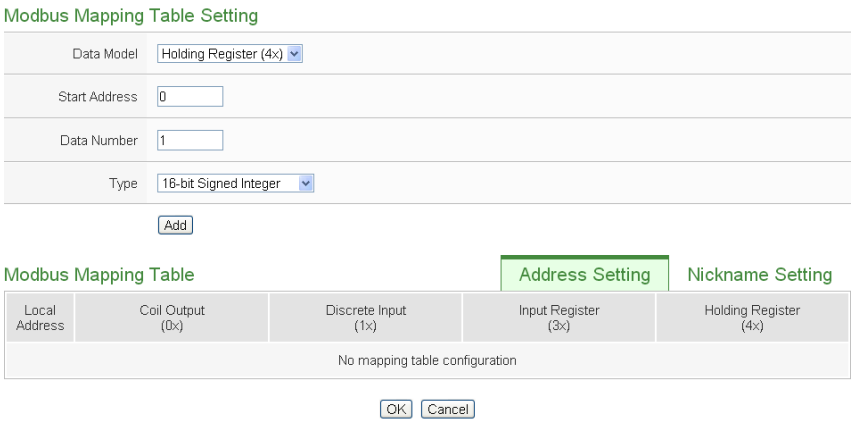


Figure7-49 : Holding Register Setting Page

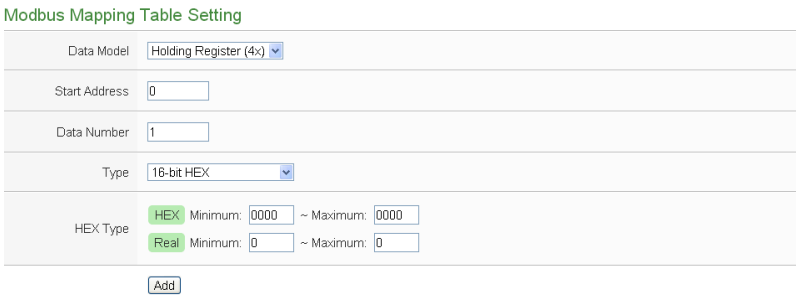
The settings are as below:

◆ Data Model: WISE-580x offers 4 Data Model selections to match the Modbus RTU Slave module configuration. Please refer to the section “The Coil Output Setting of Modbus RTU Module” for detailed information. In this case please select ” Holding Register (4x)”.

◆ Start Address: Allows to set up the starting address of Holding

Register(4x) on the Modbus RTU Slave module you would like to retrieve.

- Data Number: After finishing the Start Address setting, specify the Data Number, it is the number of Holding Register data you would like to retrieve from the Start Address.
- Type: The system support 6 kinds of data type setting for Holding Register of Modbus RTU module. The 6 Data Type options are “16-bit Signed Integer”, “16-bit Unsigned Integer”, “16-bit Hex”, “32-bit Signed Long”, “32-bit Unsigned Long”, and “32-bit Floating Point”. If the “16-bit HEX” option is selected, it is required to setup the corresponding scale parameters for linear transformation from HEX value to real value. The PMC-5151 will retrieve the HEX value and transfer it to real value in floating point format, this real value could be included in the IF-THEN-ELSE rule for edition.



If users select “32-bit Signed Long”, “32-bit Unsigned Long”, or “32-bit Floating Point”, the option “Inverse(Big Endian)” will appear. Enable “Inverse(Big Endian)” to receive the data in big endian format correctly.

- After finishing the “Start Address”, “Data Number”, and “Type” setting; click on “Add” button. A new Holding Register address block will be added to the Modbus address mapping table. All added address blocks will be located in sequences staring from the Starting Address (The address number on the first column of the “Local Address” indecates the local Modbus address of PMC-5151 to keep the Holding Register data.).

  Figure 7-50 shows an example about Holding Register setting for a Modbus RTU module. The starting Modbus address of the Holding Register block is 40060(40000 + 60), it requires to set

2 continuous Holding Register data in the setting, and the data type is “32-bit Floating Point”. So that these retrieved Holding Register data will be kept in PMC-5151 Address 40300 and 40302.

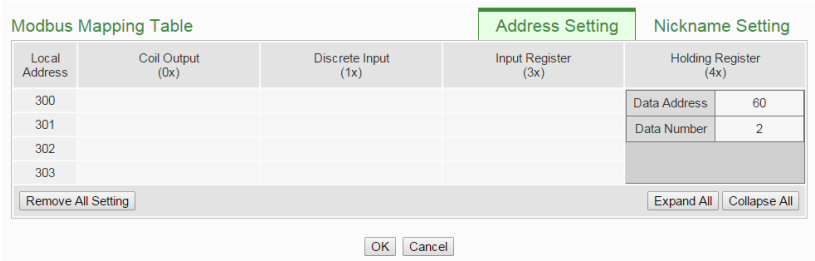
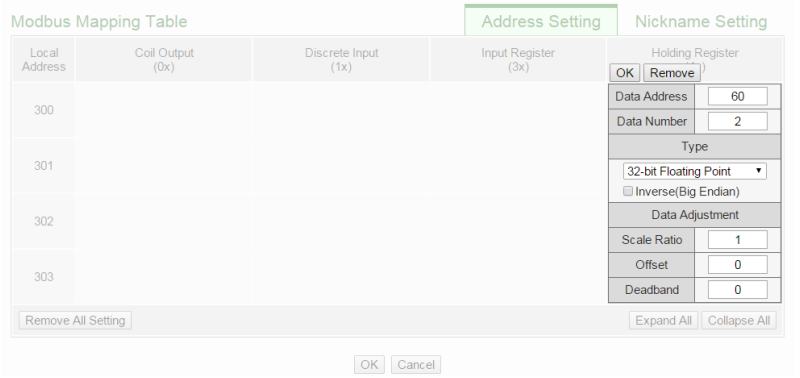


Figure7-50 : Input Register Setting Example for Modbus RTU Module

◆ To modify the starting address or quantity setting, please click on the setting block to perform the modification. The user could also modify Type, Scale Ratio, Offset and Deadband on this interface. For more detailed information, please refer to section “The Input Register Setting of Modbus RTU Module”.



◆ If the user wants to assign a Nickname for the address blocks, the user can click on the “Nickname Setting” tab, and then input the Nickname for each address block. The Nickname will be shown in the “I/O Information” and “Rule Setting” pages.

◆ After all Holding Register settings of the Modbus RTU module

are completed, click “OK” button to save the changes.

7.3.7 Modbus TCP Module Setting

PMC-5151 allows connections to modules that support Modbus TCP Slave protocol for offering I/O interface function. Through Modbus TCP protocol, it enables to read or write 4 types of Modbus data (Coil Output, Discrete Input, Input Register and Holding Register) from the Modbus TCP Slave modules. And by PMC-5151 IF-THEN-ELSE rule engine, it allows to perform automation control operation on the modules. And with SCADA software, it also allows monitoring and control of the Modbus TCP modules which connect with the PMC-5151. The Modbus TCP Slave Module setting page is shown as follow:

Figure7-51： Modbus TCP Slave Module Setting Page(1)

The settings are as below:

- Nickname：For user to define nickname for each I/O channel, this nickname will be displayed on the “I/O Information” and “Rule Setting” pages.
- Description：The Description field provides a space for the user to make a brief description of this module.
- IP：Allows modification of the IP address of this Modbus TCP Slave module, make sure the IP setting is the same as the settings of the module. If the setting is not accurate, the connection for PMC-5151 to the module will be failed.
- Port：Allows modification of the Port number of this Modbus TCP Slave module, make sure the Port number is the same as the settings of the module. If the setting is not accurate, the connection for PMC-5151 to the module will be failed.

- NetID：Allows modification of the NetID of this Modbus TCP Slave module, make sure the NetID is the same as the settings of the module. If the setting is not accurate, the connection for PMC-5151 to the module will be failed.
- Scan Rate: Input the time interval for PMC-5151 to periodically retrieve the I/O channel data of this Modbus TCP module, the setting range will be 0 ~ 65535 seconds.
- Polling Timeout: The time interval for PMC-5151 to send command to the Modbus TCP module and wait for the response, the unit will be ms. The setting range will be 1-10000 ms.
- Retry Interval: The time interval to wait for PMC-5151 to repeatedly send command again when PMC-5151 sends command to the Modbus TCP module and get no response. The unit will be second. The setting range will be 3 ~ 65535 seconds.

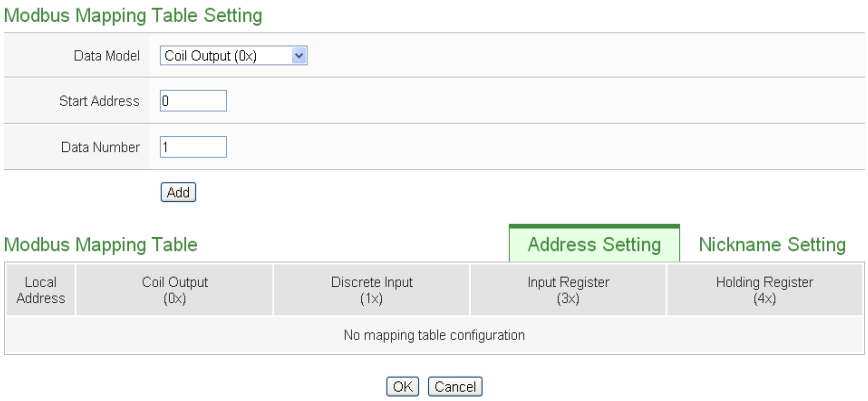


Figure7-52 : Modbus TCP Slave Module Setting Page(2)

For more detailed information about the data setting of the Coil Output, Discrete Input, Input Register and Holding Register of the Modbus TCP module, please refer to section "7.3.6 Modbus RTU Module Setting". After all settings are completed, click "Save" button to save the changes.

8 Logger Setting

The Logger Setting function of the PMC-5151 provides recording of the power data from power meters and the I/O channel data from I/O modules. It includes Power Data Logger and User-Defined Data Logger. The Power Data Logger is exclusive for the recording of the power data, and User-Defined Data Logger allows user to define his own data recording options from power data, I/O channel data or Internal Register data. The data log files of these two data loggers are both in CSV format that enables easy intergration with the backend database system. In addition, PMC-5151 also provides function to set the “Log File Retention Time” to specify how long will the files be kept in the PMC-5151, and then the file will be automatically sent to backend FTP Server at a scheduled time. The data logger setting page is shown as below:

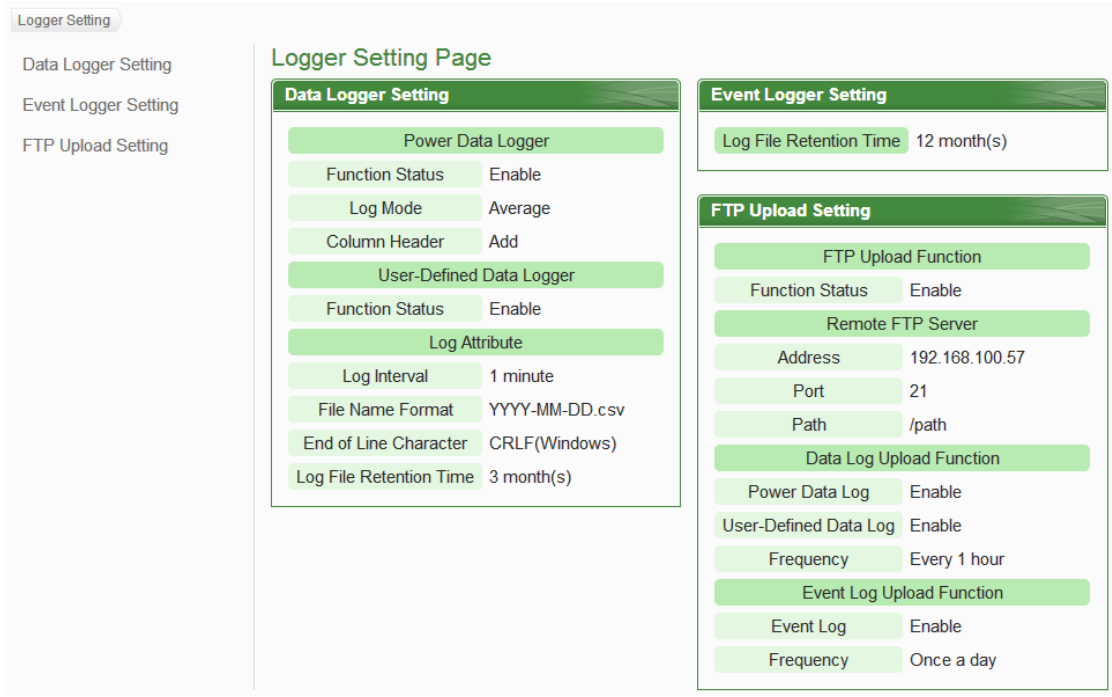


Figure8-1 : Data Logger Setting Page

There are some setting options on the Data Logger Setting page:

- Data Logger Setting
  - Power Data Logger
  - User-Defined Data Logger
- Event Logger Setting
- FTP Upload Setting

More detailed information of these options will be given in the following section.

8.1 Data Logger Setting

On the Data Logger Setting page, the user could enable the Power Data Logger or User-Defined Data Logger of the PMC-5151 if required. The Power Data Logger allows recording the power data of the power meters that are connected to the PMC-5151, and the User-Defined Data Logger allows recording user-defined data such as: power data, I/O channel data, internal register values, etc. The setting page is shown as below:

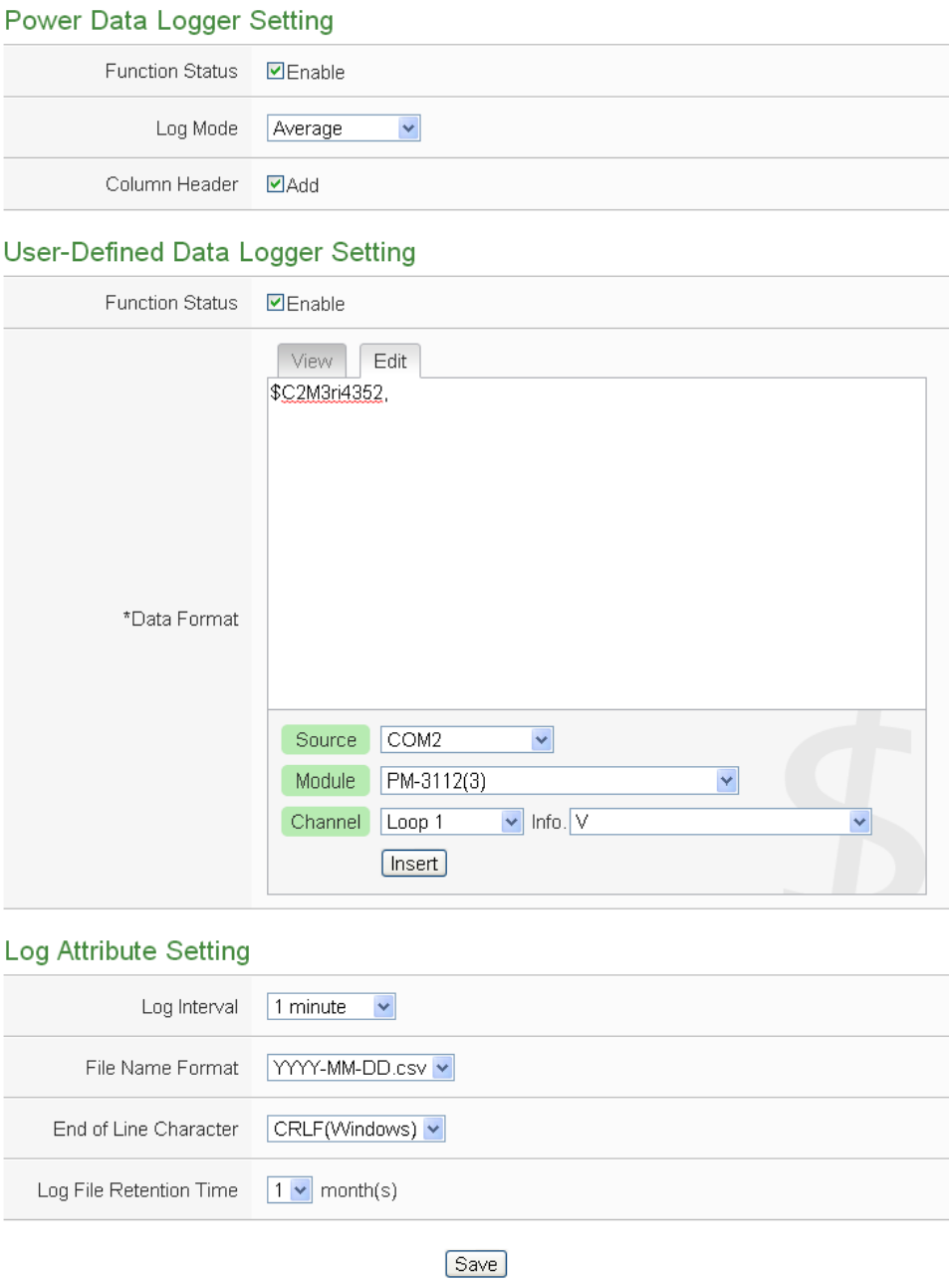


Figure8-2 : Data Logger Setting Page

Follow the steps below:

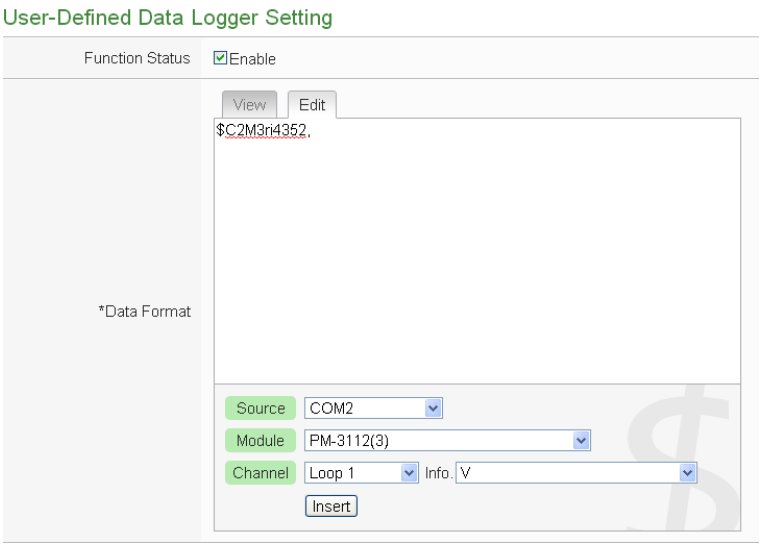
i Check “Enable” in the “Function Status” field under the Power Data Logger section to enable the Power Data Logger function.

ii Set the data log mode to be “Average” or “Instantaneous” from the dropdown list of the “Log Mode”. If “Average” is selected, the system will record the average value of the power data during the time interval set in “Log Interval”. If “Instantaneous” is selected, the system will record the instantaneous value of the power data when the time reaches the the time interval set in “Log Interval”.

iii If user would like to add a header to the power data to specify the name of the power data; click “Add” in the “Column Header”; the system will add the “Column Header” at the beginning of the power data logger file to specify the name of the power data.

iv Check “Enable” in the “Function Status” field under the User-Defined Data Logger section to enable the User-Defined Data Logger function.

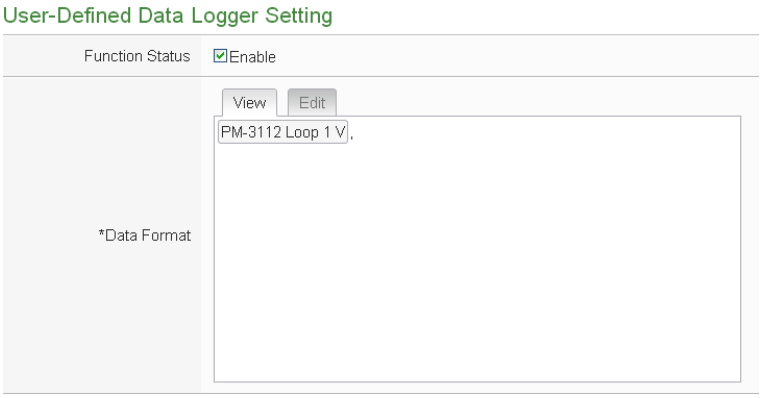
v Set up the data format in the “Data Format” field in the “User-Defined Data Logger” section. The User-Defined Data Logger provides encoded strings for user to add real-time power data or I/O channel data to the Data Format content. User can select the “Edit” tab or click on any blank area in the “Data Format” field, and then the “Real-time variable editor” will be shown as below.



Select the “Source”, “Module” and “Channel” from the dropdown list and click “Insert” to add channel value encoded string into the “Data Format” content. The system will record the data the user pre-set in the Data Format, and will save the real data values in the data log file. When editing the content, the user can select the “View” tab , and then

the channel encoded string will be displayed in the real index format of the channel for user to check the settings in an easy way.

The figure above shows an example of the encoded strings, the variable $C2M3ri4352 indicates the V value of PM-3112 Loop 1 on the module 3 connected to COM2. When user select the "View" tab, the channel value encoded string will de displayed as "PM-3112 Loop1 V" for user to check if the setting is appropriate (please refer to the figure as below).



vi In the "Log Interval" field, select from the dropdown list to set the time interval of the recording session. The Log Interval could be 1 min, 5 mins, 15 min, 1 hour, 3 hours, 6 hours, 12 hours and 24 hours. Default is 5 mins. Each time when reaches the Log Interval, it will perform one-time data recording for the Power Data and User-Defined Data.

vii In the "File Name Format" field, select the File Name Format of the log file from the dropdown list, YYYY indicates western year, MM indicates month, DD indicates date, and the file format is CSV.

viii In the "End of Line Character" field, select the appropriate End of Line Character format from the dropdown list: CRLF (applies to Windows), LF (applies to Unix/Linux) or CR (applies to Mac).

ix In the "Log File Retention Time" field, select the file retention time for the log file from the dropdown list. The retention time can be 1 month, 2 months, 3 months or 6 months. The default setting will be 3 months.

x After all settings are completed, click "Save" button to save the changes.

Please Note: The settings in "Log Attribute Setting" section apply to both Power Data Logger and User-Defined Data Logger.

8.2 Event Logger Setting

The Event Logger allows to record system event of the PMC-5151, the setting page is shown as below:

Figure8-3 : Event Logger Setting Page

Follow the steps below:

i In the “Log File Retention Time” field, select the file retention time for the log file from the dropdown list. The retention time can be 1 month, 6 months or 12 months. The default setting will be12 months.

ii After all settings are completed, click “Save” button to save the changes.

8.3 FTP Upload Setting

Both Power Data logger files and User-Defined Data logger files can be upload to remote FTP server of the manage center via FTP protocol. The FTP Upload Setting page allows to set up parameters for FTP Upload, the setting page is shown as below:

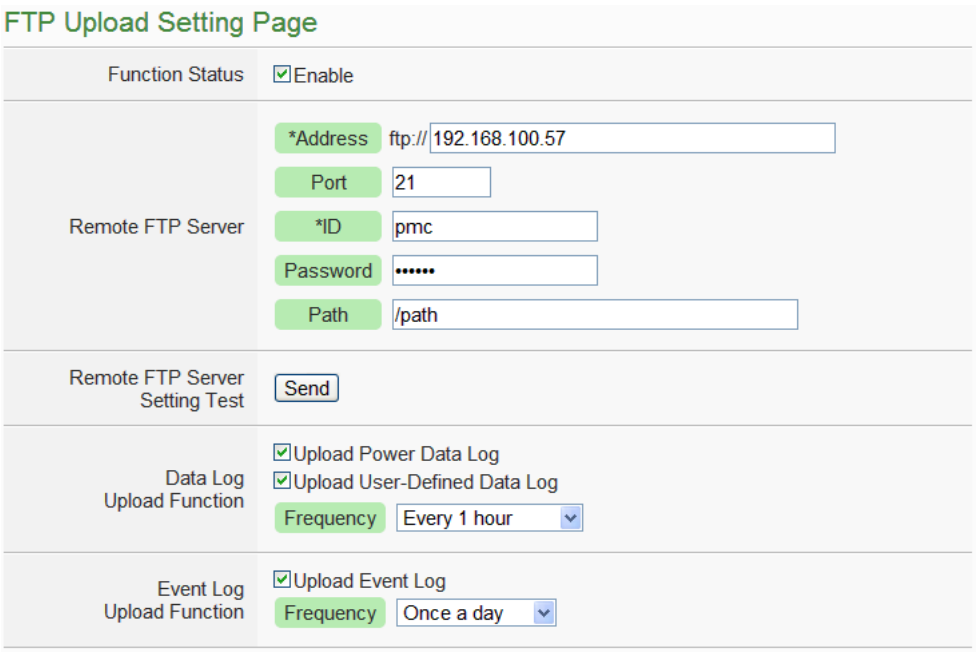


Figure8-4 : FTP Upload Setting Page

Follow the steps below:

i In the “Function Status”, check “Enable” to enable the FTP Upload function.

ii In the “Remote FTP Server” section, input Address, Port, ID, Password and Path

iii The user could test if the FTP settings are correct in the "Remote FTP Server Setting Test" section. After clicking “Send”, the system will create a folder on the remote FTP server and will generate a test file under this folder.

iv In the “Data Log Upload Function” section, select the data log type user would like to upload. The data log type could be “Power Data Log” or “User-Defined Data Log”. And then select the Frequency from the dropdown list of the “Frequency” field. The Frequency can be set as: 5 mins, 15 mins, 1 hour, 3 hours, 6 hours, 12 hours, or 24 hours. The default setting will be 1 hour.

v In the Event Log Upload Function section, if the user would like to enable the Upload Event Log function, check “Upload Event Log” field. And then select the Frequency from the dropdown list of the “Frequency” field. The Frequency can be set as: once a day, once a week or once a month.

vi After all settings are completed, click “Save” button to save the changes.

Please Note:

1. All data logger files of PMC-5151 will be saved in the microSD card. Before enable the Data Logger function, please make sure the microSD card you use for PMC-5151 is FAT32 format.
2. The microSD card given with the PMC-5151 is in FAT32 format already before delivery.

8.4 The Path of Data Log File

The data logger files of PMC-5151 will all be saved in the microSD card. The following section will explain the path of the data logger files saved in the microSD card:

- The power data files will be saved in the Log file folder, each power meter will create a specific file folder with the name of its ID, the data file architecture is shown as below:
  - Modbus RTU Power Meter

    Power Meter Data File

    Log \ 01A3851F140000D3_2[3133]7 _info.txt

    Historical Data

    Log \ 01A3851F140000D3_2[3133]7 \ 2013-05-23.csv

    Daily Report

    Log \ 01A3851F140000D3_2[3133]7 \ 2013-05-23Rpt.csv

    Monthly Report

    Log \ 01A3851F140000D3_2[3133]7 \ 2013-05Rpt.csv

    01A3851F140000D3_2[3133]7 is the ID of this power meter. 01A3851F140000D3 indicates the serial number of the PMC-5151; 2 indicates the power meter is connected to the COM2 of the PMC-5151; [3133] indicates the module type of the power meter; 7 is the Modbus Address of the power meter; and 2013-05-23 indicates the date the data is recorded. The power meter information file (_info.txt) is used to record the nickname of the power meter and the related information of the PMC-5151 which connect to the power meter.

  - Modbus TCP Power Meter

    Power Meter Data File

    Log \ 192.168.100.20_502_00D3 [3112]1 _info.txt

    Historical Data

    Log \ 192.168.100.20_502_00D3 [3112]1 \ 2013-05-23.csv

Daily Report

Log \ 192.168.100.20_502_00D3 [3112]1 \ 2013-05-23Rpt.csv

Monthly Report

Log \ 192.168.100.20_502_00D3 [3112]1 \ 2013-05Rpt.csv

192.168.100.20_502_00D3[3112]1 為該電表的 ID；
192.168.100.20_502_00D3[3112]1 is the ID of this power meter. 192.168.100.20 indicates the connection IP of the power meter; 502 indicates the port number of the power meter; 00D3 indicates the last 4 digits of the serial number of PMC-5151; [3112] indicates the module type of the power meter; 1 indicates the NetID of the power meter; and 2013-05-23 indicates the date the data is recorded. The power meter information file (_info.txt) is used to record the nickname of the power meter and the related information of the PMC-5151 which connect to the power meter.

- The User-Defined Data Log file is also saved under the Log file folder; the data file architecture is shown as below:

  Log \ Custom_01A3851F140000D3 \ 2013-05-23.csv

  Custom indicates this file folder is for User-Defined Data Log; 01A3851F140000D3 indicates the serial number of the PMC-5151 and 2013-05-23 indicates the date the data is recorded.

- The Event Log file is saved under the EventLog folder, the data file architecture is shown as below:

  EventLog \ Event-2013-05-23.log

  20130523 indicates that the first event recorded in the Event Log file is starting from May 23, 2013

8.5 The format of the Power Data Logger file

The power data logger files generated are in CSV format. Each line represents one record; each field in the line is separated by a comma. The data sequences from left to right in the line of the power data are as follows:

PM-2133 / PM-3133(-MTCP) Data Logger Field

Date, Time, Power meter ID, **Phase A** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand(15/30/60 mins) **]**, **Phase B** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand(15/30/60 mins) **]**, **Phase C** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand(15/30/60 mins) **]**, **Average/Total** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand (15/30/60 mins) **]**, [Reserved Field].

PM-2134 / PM-3112(-MTCP) / PM-3114(-MTCP) Data Logger Field

Date, Time, Power meter ID, **CT1** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand(15/30/60 mins) **]**, **CT2** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand(15/30/60 mins) **]**, **.....** , **CTN** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand(15/30/60 mins) **]**, [Reserved Field].

PM-4324 Data Logger Field

Date, Time, Power meter ID, **Submeter 1** **Phase A/CT1** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand(15/30/60 mins) **]**, **Phase B/CT2** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand(15/30/60 mins) **]**, **Phase C/CT3** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand(15/30/60 mins) **]**, **Average/Total** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand (15/30/60 mins) **]**, **Submeter 2** **Phase A/CT4** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand(15/30/60 mins) **]**, **Phase B/CT5** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand(15/30/60 mins) **]**, **Phase C/CT6** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand(15/30/60 mins) **]**, **Average/Total** **[** Voltage, Current, kW, kvar,

kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand (15/30/60 mins) **]** , **.....** , **Submeter 8** **Phase A/CT22** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand(15/30/60 mins) **]**, **Phase B/CT23** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand(15/30/60 mins) **]**, **Phase C/CT24** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand(15/30/60 mins) **]**, **Average/Total** **[** Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Daily tot. Electricity(kWh), Current demand (15/30/60 mins) **]** , [Reserved Field].

8.6 The format of the Power Report file

The power report files are saved in CSV format. Each line represents one record; each field in the line is separated by a comma. The data sequences from left to right in the line of the power report are as follows.

PM-2133 / PM-3133(-MTCP) Daily Report

Index of hour, Date, Power meter ID, Timing of hourly max kW, hourly max kW, Hourly total Electricity, Average hourly PF, Average hourly current(Phase A), Average hourly current(Phase B), Average hourly current(Phase C), Average hourly voltage(Phase A), Average hourly voltage(Phase B), Average hourly voltage(Phase C), Total hourly kVA, Total hourly kvar, [Reserved Field].

PM-2133 / PM-3133(-MTCP) Monthly Report

Index of Date, Date, Power meter ID, Timing of daily max kW, Daily max kW, Daily total Electricity, Average daily PF, Average daily current(Phase A), Average daily current(Phase B), Average daily current(Phase C), Average daily voltage(Phase A), Average daily voltage(Phase B), Average daily voltage(Phase C), Total daily kVA, Total daily kvar, [Reserved Field].

PM-2134 / PM-3112(-MTCP) / PM-3114(-MTCP) Daily Report

Index of hour, Date, Power meter ID, CT1 [Timing of hourly max kW, hourly max kW, Hourly total Electricity, Average hourly PF, Average hourly current, Average hourly voltage, Average hourly kVA, Average hourly kvar], CT2 [Timing of hourly max kW, hourly max kW, Hourly total Electricity, Average hourly PF, Average hourly current, Average hourly voltage, Average hourly kVA, Average hourly kvar], ... ,CTN [Timing of hourly max kW, hourly max kW, Hourly total Electricity, Average hourly PF, Average hourly current, Average hourly voltage, Average hourly kVA, Average hourly kvar] ,[Reserved Field].

PM-2134 / PM-3112(-MTCP) / PM-3114(-MTCP) Monthly Report

Index of date, Date, Power meter ID, CT1 [Timing of daily max kW, daily max kW, daily total Electricity, Average daily PF, Average daily current, Average daily voltage, Average daily kVA, Average daily kvar], CT2 [Timing of daily max kW, daily max kW, daily total Electricity, Average daily PF, Average daily current, Average daily voltage, Average daily kVA, Average daily kvar] , ... , CTN [Timing of daily max kW, daily max kW, daily total Electricity, Average daily PF, Average daily current, Average daily voltage, Average daily kVA, Average daily kvar], [Reserved Field].

PM-4324 Daily Report

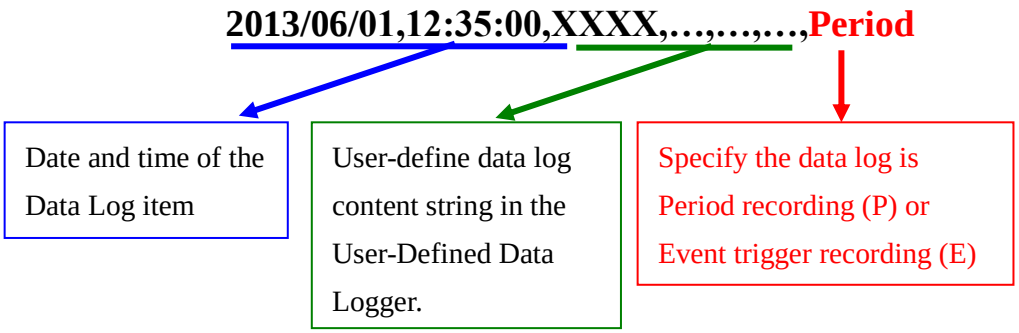
Date, Time, Power meter ID, **Submeter 1** **CT1** **[**Timing of hourly max kW, hourly max kW, hourly total Electricity, Average hourly PF, Average hourly current, Average hourly voltage, Average hourly kVA, Average hourly kvar**]**, **CT2** **[**Timing of hourly max kW, hourly max kW, hourly total Electricity, Average hourly PF, Average hourly current, Average hourly voltage, Average hourly kVA, Average hourly kvar**]**, **CT3** **[**Timing of hourly max kW, hourly max kW, hourly total Electricity, Average hourly PF, Average hourly current, Average hourly voltage, Average hourly kVA, Average hourly kvar**]**, **Average/Total** **[**Timing of hourly max kW, hourly max kW, hourly total Electricity, Average hourly PF, Average hourly current, Average hourly voltage, Total hourly kVA, Total hourly kvar**]**, **Submeter 2** **CT4** **[**Timing of hourly max kW, hourly max kW, hourly total Electricity, Average hourly PF, Average hourly current, Average hourly voltage, Average hourly kVA, Average hourly kvar**]**, **CT5** **[**Timing of hourly max kW, hourly max kW, hourly total Electricity, Average hourly PF, Average hourly current, Average hourly voltage, Average hourly kVA, Average hourly kvar**]**, **CT6** **[**Timing of hourly max kW, hourly max kW, hourly total Electricity, Average hourly PF, Average hourly current, Average hourly voltage, Average hourly kVA, Average hourly kvar**]**, **Average/Total** **[**Timing of hourly max kW, hourly max kW, hourly total Electricity, Average hourly PF, Average hourly current, Average hourly voltage, Total hourly kVA, Total hourly kvar**]** , **.....** , **Submeter 8** **CT22** **[**Timing of hourly max kW, hourly max kW, hourly total Electricity, Average hourly PF, Average hourly current, Average hourly voltage, Average hourly kVA, Average hourly kvar**]**, **CT23** **[**Timing of hourly max kW, hourly max kW, hourly total Electricity, Average hourly PF, Average hourly current, Average hourly voltage, Average hourly kVA, Average hourly kvar **]**, **CT24** **[**Timing of hourly max kW, hourly max kW, hourly total Electricity, Average hourly PF, Average hourly current, Average hourly voltage, Average hourly kVA, Average hourly kvar**]**, **Average/Total** **[**Timing of hourly max kW, hourly max kW, hourly total Electricity, Average hourly PF, Average hourly current, Average hourly voltage, Total hourly kVA, Total hourly kvar**]** , [Reserved Field].

PM-4324 Monthly Report

Date, Time, Power meter ID, **Submeter 1** **CT1** **[**Timing of daily max kW, daily max kW, daily total Electricity, Average daily PF, Average daily current, Average daily voltage, Average daily kVA, Average daily kvar**]**, **CT2** **[**Timing of daily max kW, daily max kW, daily total Electricity, Average daily PF, Average daily current, Average daily voltage, Average daily kVA, Average daily kvar**]**, **CT3** **[**Timing of daily max kW, daily max kW, daily total Electricity, Average daily PF, Average daily current, Average daily voltage, Average daily kVA, Average daily kvar**]**, **Average/Total** **[**Timing of daily max kW, daily max kW, daily total Electricity, Average daily PF, Average daily current, Average daily voltage, Total daily kVA, Total daily kvar**]**, **Submeter 2** **CT4** **[**Timing of daily max kW, daily max kW, daily total Electricity, Average daily PF, Average daily current, Average daily voltage, Average daily kVA, Average daily kvar**]**, **CT5** **[**Timing of daily max kW, daily max kW, daily total Electricity, Average daily PF, Average daily current, Average daily voltage, Average daily kVA, Average daily kvar**]**, **CT6** **[**Timing of daily max kW, daily max kW, daily total Electricity, Average daily PF, Average daily current, Average daily voltage, Average daily kVA, Average daily kvar**]**, **Average/Total** **[**Timing of daily max kW, daily max kW, daily total Electricity, Average daily PF, Average daily current, Average daily voltage, Total daily kVA, Total daily kvar**]** , **.....** , **Submeter 8** **CT22** **[**Timing of daily max kW, daily max kW, daily total Electricity, Average daily PF, Average daily current, Average daily voltage, Average daily kVA, Average daily kvar**]**, **CT23** **[**Timing of daily max kW, daily max kW, daily total Electricity, Average daily PF, Average daily current, Average daily voltage, Average daily kVA, Average daily kvar **]**, **CT24** **[**Timing of daily max kW, daily max kW, daily total Electricity, Average daily PF, Average daily current, Average daily voltage, Average daily kVA, Average daily kvar**]**, **Average/Total** **[**Timing of daily max kW, daily max kW, daily total Electricity, Average daily PF, Average daily current, Average daily voltage, Total daily kVA, Total daily kvar**]** , [Reserved Field].

8.7 The Format of User-Defined Data File

The User-Defined Data files are saved in CSV format. Each line represents one record, after the log format of the data being set in User-Defined Data Logger, the User-Defined Data Logger will record the data according to the data format and content set by the user. In addition, the system will tag each data log with information such as: date, time and type of the data, etc. The log type could be Period Recording that will record the file periodically or Trigger Recording that will record the file when an event is triggered. The User-Defined Data log file format is shown as below:


2013/06/01,12:35:00,XXXX,…,…,…,Period
Date and time of the Data Log item
User-define data log content string in the User-Defined Data Logger.
Specify the data log is Period recording (P) or Event trigger recording (E)

9 Advanced Setting

Advanced Setting provides additional features and allows you to perform more setting on the PMC devices. Click on the Advanced Setting button, a column of buttons will appear on the left of the page:

- Email Setting
- SMS Setting
- SNMP Trap Setting
- Timer Setting
- Schedule Setting
- PUE Setting
- Internal Register Setting
- Flash HMI Setting

After complete the Advanced Setting, all the setting you define in the section will be the property in the IF-THEN-ELSE rule setting page. Please note: In order to avoid possible error when performing rule definition (IF-THEN-ELSE), please always finish configuration in Advanced Setting before starting to define Rules. Avoid unnecessary change in Advanced Setting after you finish rule definition. Unexpected errors might occur if you violate this sequence: Advanced Setting→ Rule Setting. In case you make any modification, please double check your settings and Rules definition to make sure no errors are present. The following sections will describe more detailed information for these configurations.

9.1 Email Setting

PMC-5151 support Email messages sending function. This function allows sending pre-input Email message(s) to pre-set Email receiver(s) under certain conditions. The configuration page is shown as below:

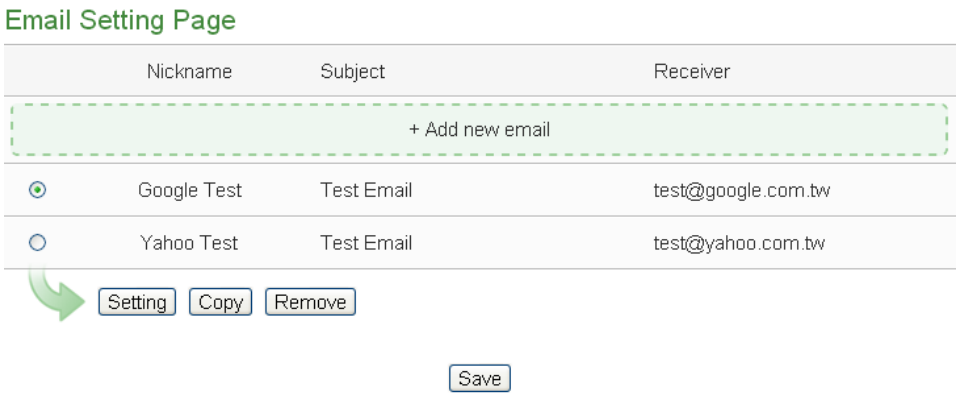


Figure9-1 : Email setting page

The settings steps are as below:

i Click on “Add new email” to add a new email setting.

ii After clicking the “Add new email”, a setting page will appear, input name in the “Name” field and you could also input the description of this email in the “Description” field; shown as below:

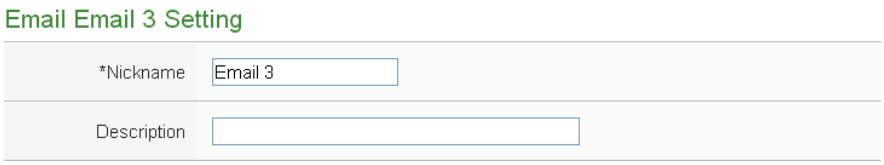


Figure9-2 : Email setting page(Name & Description))

iii In the “SMTP Server” field, enter the IP or the domain name of the SMTP server; or select the SMTP server from the dropdown list. In the dropdown list, PMC-5151 provide four public SMTP servers for selection as below:

- Google Gmail
- Yahoo Mail
- Microsoft Outlook / Hotmail
- AOL Mail

After select SMTP server from the dropdown list, PMC will automatically complete the “Port Number” and “Security” setting related to the SMTP server you select. The SMTP Setting page is shown as below:

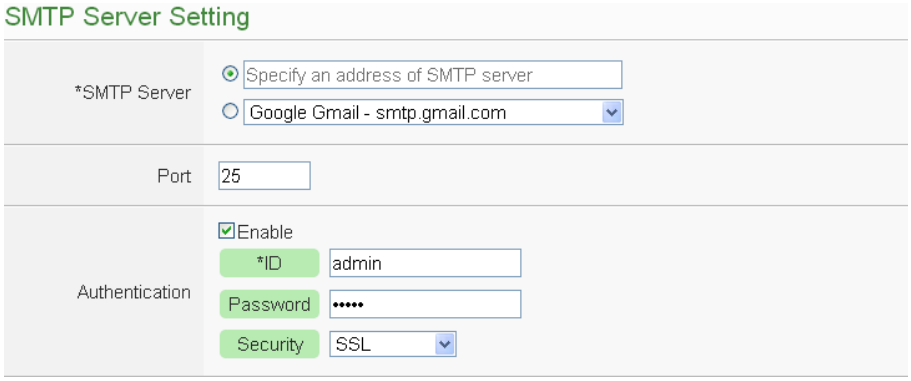


Figure9-3 : Email setting page(SMTP Server)

iv Input the Port number, the default port number is set as 25.

v If the SMTP server requires account and password validation, please select the “Enable” checkbox, and continue steps vi~viii to login into the SMTP server. If the SMTP server doesn’t need account and password validation, uncheck the “Enable” checkbox and go directly to step ix.

vi Enter the SMTP server login ID in the “Login ID” field.

vii Enter the SMTP server password in the “Password” field.

viii In the “Security” field, select the security setting to be “No Security”, “TLS”, or “SSL” from the dropdown list.

ix After complete SMTP server setting, continue to input Email address setting. In the “Sender Name” field, input the name of the sender. The Email Address Setting page is shown as below:

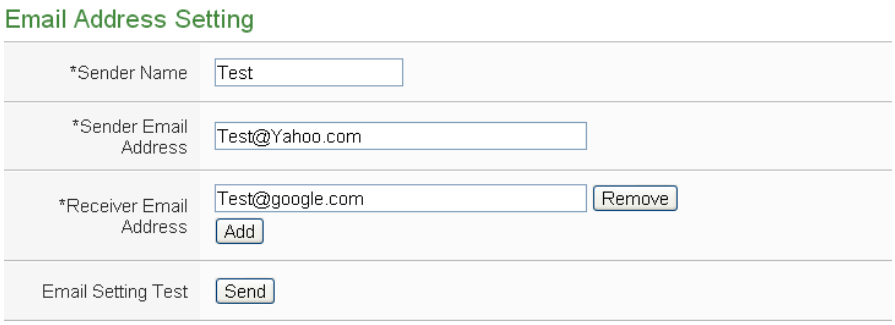


Figure9-4 : Email setting page(Email Address)

x Enter the sender’s email address in the “Sender Email Address” field.

xi In the “Receiver Email Address” section, click on “Add” to add the receiver’s email address. At least one email address has to be entered.

xii To verify whether your email setting is correct to send the Email, click “Send” in the “Email Setting Test” section, then PMC-5151 will send a test Email to the receiver’s email address.

After complete Email Address setting, continue to input Email Content setting. Enter the email subject in the “Subject” field. The Email Content Setting page is shown as below:

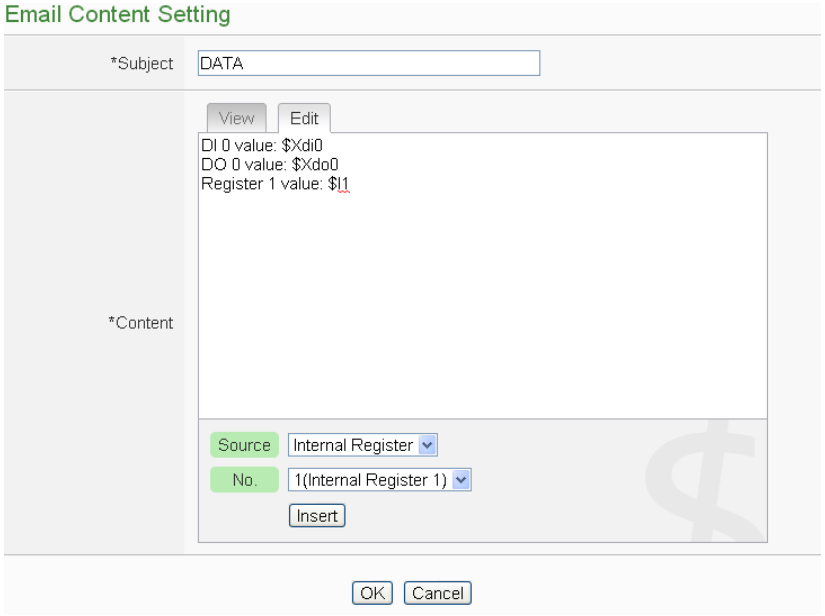


Figure9-5 : Email setting page(Email Content)

xiii Enter the content in the “Content” section. In addition, it provides encoded strings for users to add current I/O channel value, power data or Internal Register value into the Email content. To make it easy to add the encoded string, PMC provides “Real-time variable editor”. Please refer to "8.1 Data Logger Setting“ for more detailed information of the “Real-time variable editor”.

xiv Click on “OK” to confirm the setting and leave the setting page.

xv Repeat steps i~ xv to complete settings of all Emails

To modify the settings of a pre-set Email, please click on the radio button in front of the Email, and then click on “Setting” to modify the settings.

xvi To copy the settings of a pre-set Email to the new Email, please click the radio button in front of the pre-set Email and then click “Copy”, a new Email will be added to the list and the settings of the old Email will be copied to this newly added Email.

xvii To remove a pre-set Email, please click the radio button in front of the pre-set Email and then click “Remove”.

xviii After you finish all the Email selections and settings, click “Save” button to save the settings.

9.2 SMS Setting

PMC-5151 offers SMS Alarm message sending and SMS Command receiving functions (Required ICP DAS GTM-201-USB modem. Please refer to Appendix III for detail). For SMS Alarm function; it allows to send pre-set SMS alarm message to specific phone numbers. For SMS command function; it allows to set up authorized phone numbers to receive SMS commands. PMC-5151 will execute the commands received from authorized phone numbers only. There are 2 types of SMS commands:

- **Retrieve channel data (GET):** The user can retrieve specific channel real-time data. One SMS Command message can require up to 10 channel data values. The user could add the encoded string to the message to retrieve the related channel data.
- **Modify channel data (SET):** The user could modify channel data by SMS command. Each SMS command message allows to modify one channel value.

9.2.1 SMS Alarm Setting

The SMS Alarm Setting page is shown as below:

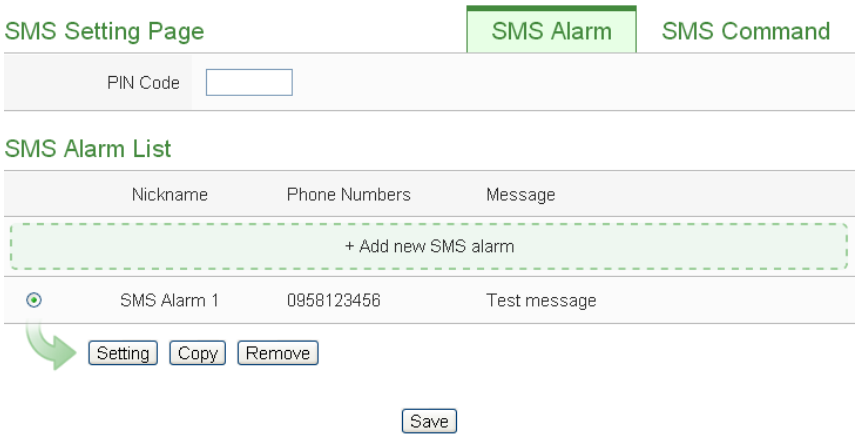


Figure9-6 : SMS Setting Page (1)

Please follow the steps below:

i Make sure the "SMS Alarm" Tab is selected.

ii In the PIN field, input the 4 digit SIM card PIN code. If the PIN code is not required, leave the field blank.

iii Click "Add new SMS alarm", the SMS Alarm Setting page will appear as follow:

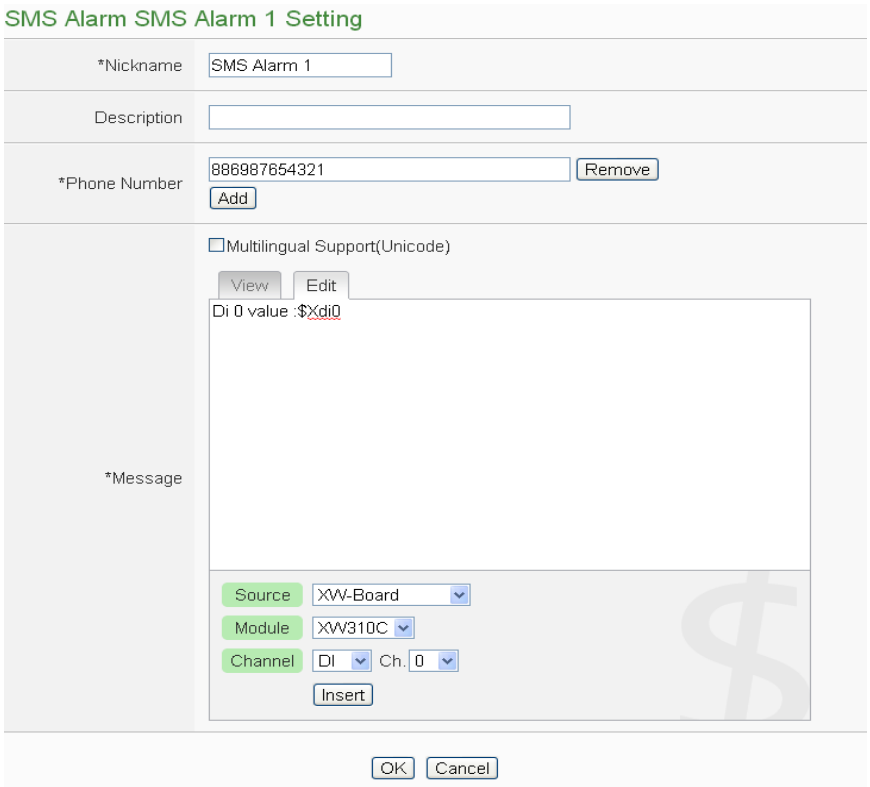


Figure9-7 : SMS Setting Page (2)

iv Input name in the “Name” field and you could also input the description of this SMS Alarm in the “Description” field.

v In the “Phone Number” section, click on “Add” to input the phone numbers **t**o receive the SMS Alarm messages. The SMS can be sent to multiple receivers. Keep on clicking “Add” to add all phone numbers to receive the Alarm message, click “Remove” to remove the phone numbers you want to delete.

vi Enter the content in the “Message” field. If the Unicode mode is adopted, the length of the content cannot exceed 70 characters. If the Unicode mode is not selected (will support English characters only), the length of the content limit is 160 characters. SMS Alarm provides an encoded string for you to add current I/O channel data, power data or Internal Register data into SMS Alarm message. To make it easy to add the encoded string, PMC provides “Real-time variable editor”. Please refer to “8.1 Data Logger Setting” for more detailed information of the “Real-time variable editor”.

vii Click on “OK” to confirm the setting and leave the setting page.

viii Repeat steps iii~vii to complete settings of all SMS Alarm setting.

ix To modify the settings of a pre-set SMS Alarm, please click on the radio button in front of the SMS Alarm, and then click on “Setting” to modify the settings.

x To copy the settings of a pre-set SMS Alarm to the new SMS Alarm, please click the radio button in front of the pre-set SMS Alarm and then click “Copy”, a new SMS Alarm will be added to the list and the settings of the old SMS Alarm will be copied to this newly added SMS Alarm.

xi To remove a pre-set SMS Alarm, please click the radio button in front of the pre-set SMS Alarm and then click “Remove”.

xii After you finish all the SMS Alarm selections and settings, click “Save” button to save the settings.

9.2.2 SMS Command Setting

The SMS Command Setting page is shown as below:

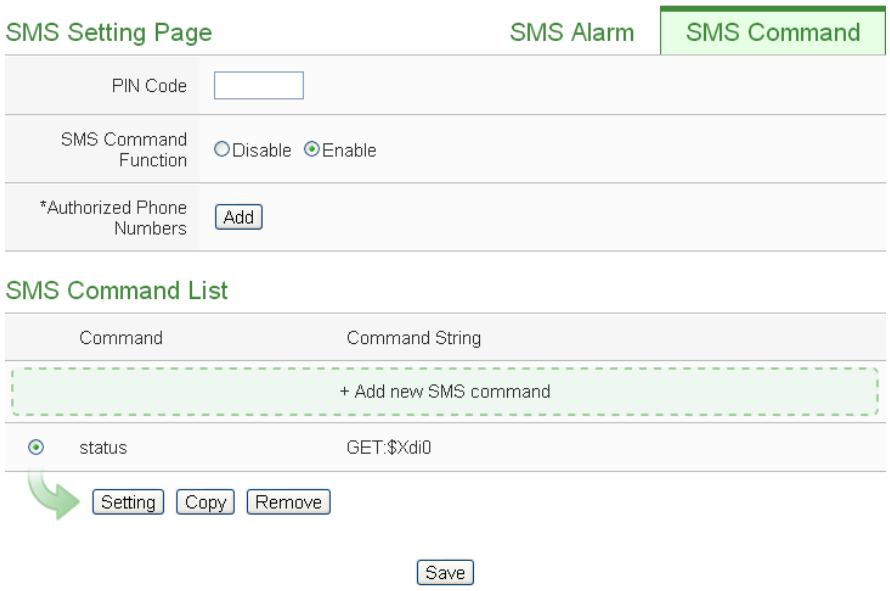


Figure9-8 : SMS Command Setting Page (1))

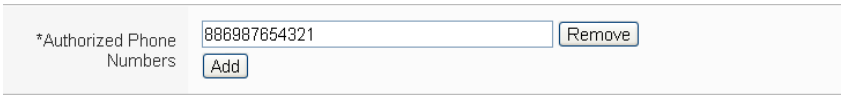
Please follow the steps below:

i Make sure the "SMS Command" Tab is selected.

ii In the PIN field, input the 4 digit SIM card PIN code. If the PIN code is not required, leave the field blank.

iii In the "SMS Command Function" section, click on "Enable" to enable SMS Command function. The SMS Command list will be displayed. If "Disable" is selected, the SMS Command list will be disabled.

iv In the "Authorized Phone Number" field, click on "Add" to input the phone numbers you would like to authorize to send SMS commands to PMC-5151. Keep on clicking "Add" to add all phone numbers to send the SMS commands to PMC-5151, click "Remove" to remove the phone numbers you want to delete. Please note: the Authorized Phone Number has to be input in the format: "Country code, area code and number". For example, if the Authorized Phone Number is a cell phone number 0987654321 in Taiwan area, please input the Authorized Phone Number as "886987654321".



v Click “Add new SMS command”, the SMS Command Setting page will appear.

vi Input a command string in the “Command” field as the nickname for the original corresponding command in the “Command String Editor” section. In the “Command String Editor” section, select the command type to be “GET” (retrieve real-time channel data) or “SET” (modify channel data) from the dropdown list. For “GET” command (shown as Figure 9-9); It provides an encoded string for you to add current I/O channel data, power data or Internal Register data into SMS command. To make it easy to add the encoded string, PMC provides “Real-time variable editor”. Please refer to “8.1 Data Logger Setting” for more detailed information of the “Real-time variable editor”. For “SET” command (shown as Figure 9-10), select “Source”, “Module” and “Channel” from the dropdown list, and then set the “Value” to be modified (you can also leave the “Value” field blank, and input the value later according to requirement in real-time when send back the SMS Command). Take Figure 9-10 as an example, you can leave the “Value “field blank and input the SMS Command AI/2.3 to modify the AI channel value to be 2.3.

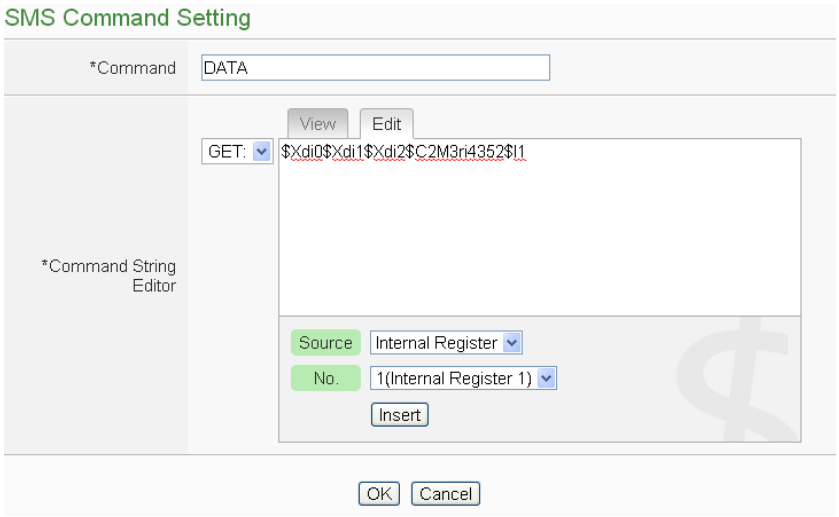


Figure9-9 : SMS Command Setting for GET Command

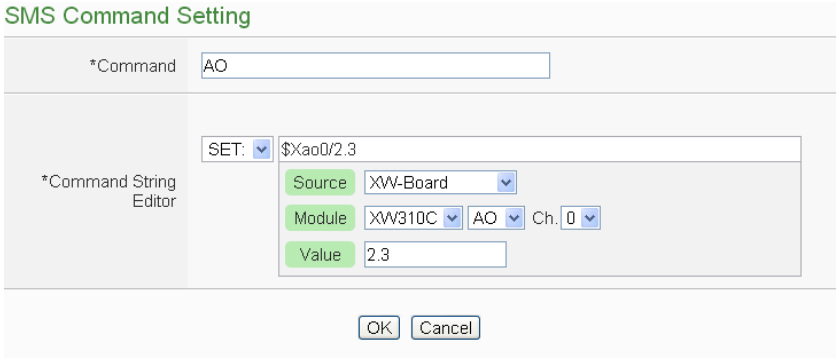


Figure9-10 : SMS Command Setting for SET Command

vii Click on "OK" to confirm the setting and leave the setting page.

viii Repeat steps v~vii to complete settings of all SMS Command setting. The SMS Command (and its original corresponding command) will be listed in the SMS Command List on the SMS Command setting page.

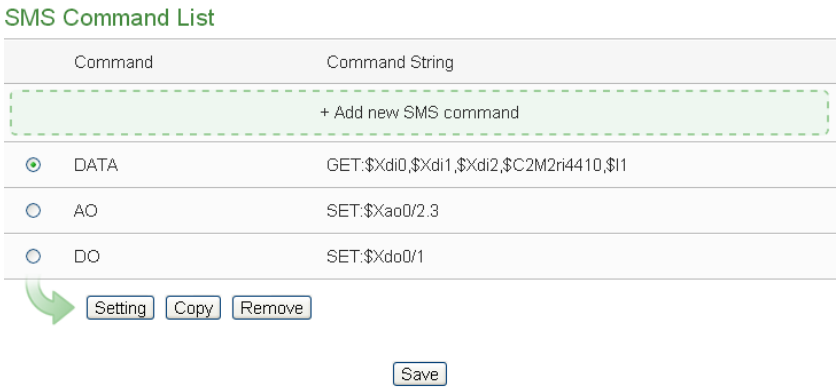


Figure9-11 : SMS Command list

On Figure 9-11, taking the first SMS Command on the list as an example, when user send SMS message "DATA" to PMC-5151, PMC-5151 will send back the data of DI0, DI1, & DI2 of the XW310C(XW-Board), the Total/Average value of the kW from module PM-2133(2) on COM2, and value of Internal Register 1 to the command sender.

Taking the second SMS Command on the list as an example, when user send SMS message "AO" to PMC-5151, PMC-5151 will set the value of AO0 on XW310C(XW-Board) to be 2.3 after receiving the message.

Taking the third SMS Command on the list as an example, when user send SMS message "DO" to PMC-5151, PMC-5151 will set

the value of DO0 on XW310C(XW-Board) to be ON after receiving the message.

ix To modify the settings of a pre-set SMS Command, please click on the radio button in front of the SMS Command, and then click on "Setting" to modify the settings.

x To copy the settings of a pre-set SMS Command to the new SMS Command, please click the radio button in front of the pre-set SMS Command and then click "Copy", a new SMS Command will be added to the list and the settings of the old SMS Command will be copied to this newly added SMS Command.

xi To remove a pre-set SMS Command, please click the radio button in front of the pre-set SMS Command and then click "Remove".

After you finish all the SMS Command selections and settings, click "Save" button to save the settings.

9.3 SNMP Trap Setting

SNMP Trap function allows PMC-5151 to initiative sending of the system data, power meter data and IO channel data to the SNMP Manager (pre-defined in the SNMP Setting page) in real time automatically when unusual events occur; so that the SNMP Manager can respond immediately with corresponding operations. The configuration page for SNMP Trap setting is shown as below:

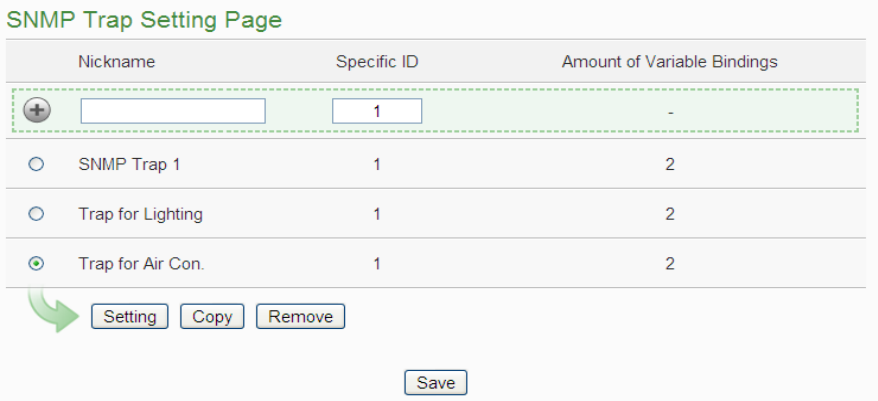


Figure9-12 : SNMP Trap Setting Page

The settings steps are as below:

i Input “Nickname” and “Specific ID” and then click button to create a new SNMP Trap.

ii To modify the settings of a pre-set SNMP Trap, please click on the radio button in front of the SNMP Trap, and then click on “Setting”, then the SNMP Trap Parameter Setting page will be showen as below. You can modify the settings of the SNMP Trap you selected if required.

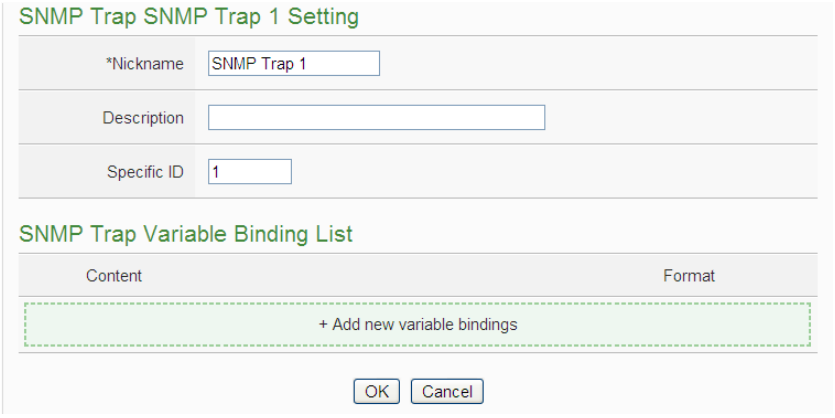


Figure9-13 : SNMP Trap Parameter Setting Page

iii In the SNMP Trap Parameter Setting page, you can input or modify the name of the SNMP Trap in the “Nickname” field and you could also input the description of this SNMP Trap in the “Description” field.

iv Input the Specifid ID value of the SNMP Trap in the “Specifid ID” field.

v Click on “Add new variable bindings” to add a new variable binding for the SNMP Trap.

vi After clicking the “Add new variable bindings”, the Variable Binding Setting Page will appear. Select the variable type first. PMC-5151 provides two variable types as “Channel Data” and “User-Defined Data” for selection. If you select the variable type as “Channel Data” type, The setting page interface will be shown as below:

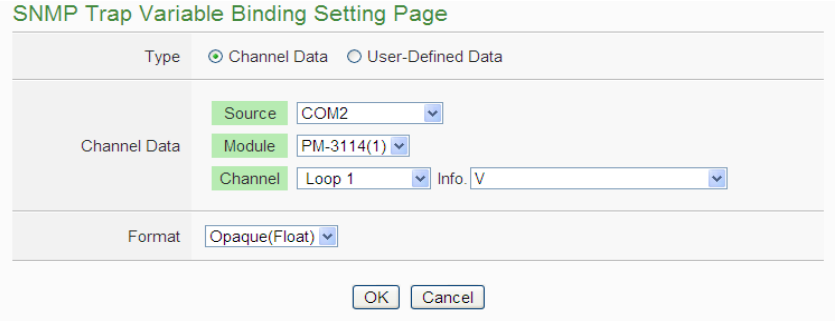


Figure9-14 : “Channel Data”Type Setting Page

Based on the “Channel Data” type interface, it provides the encoded string for user to easily add one real-time power data or I/O channel data as the variable binding in SNMP Trap each time. Select the “Source”, “Module”, “Channel” and “Format” from the dropdown list, and click the “OK” button to add the power data or I/O channel to the variable bindings list of the SNMP Trap.

The following figure shows two variable binding examples in “Channel Data” type are included in the SNMP Trap. The first variable binding is the voltage value of PM-3114 Loop 1 on the module 1 that is connected to COM2. The second variable binding is the kW value of PM-3114 Loop 1 on the module 1 that is connected to COM2.

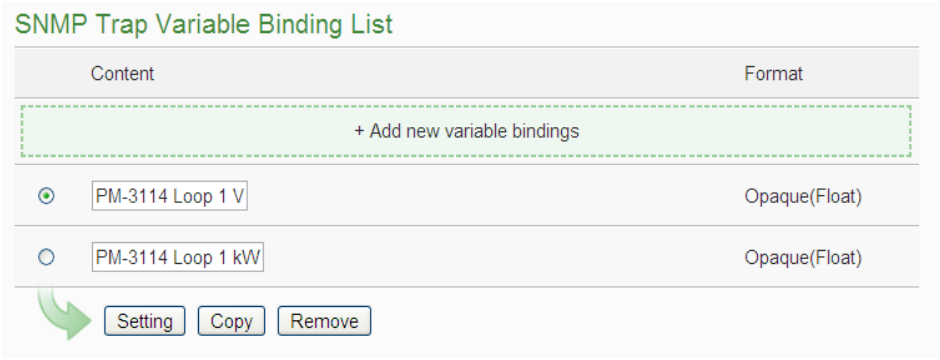


Figure9-15 : Example of "Channel Data" Type Variable Binding List

vii You can select the "User-Defined Data" as the variable type. The setting page interface will be shown as below:

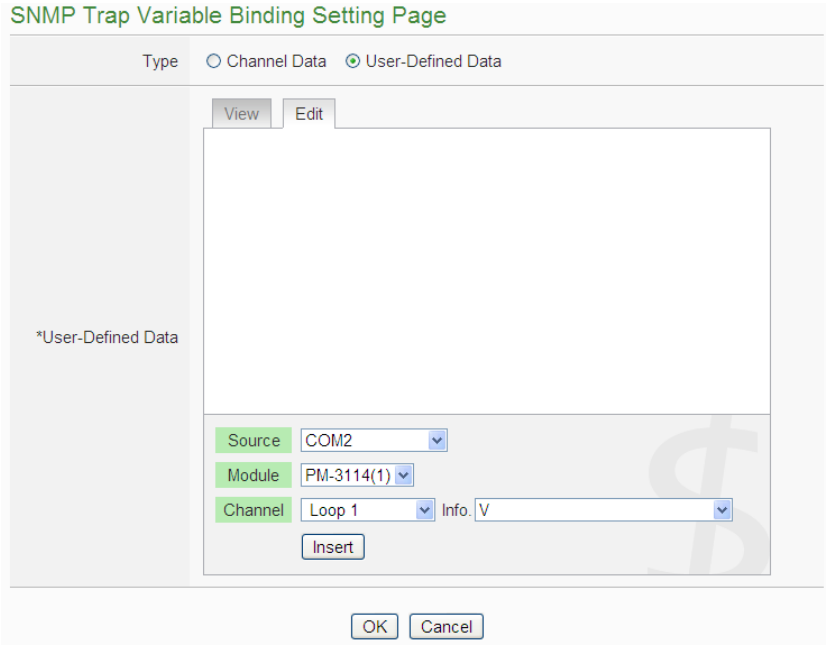


Figure9-16 : "User-Defined Data" Type Setting Page

Set up the content in the "User-Defined Data" field of the SNMP Trap Variable Binding Setting Page. The User-Defined Data provides encoded strings for user to add real-time power data or I/O channel data to the content easily. User can select the "Edit" tab or click on any blank area in the "User-Defined Data" field, and then the "Real-time variable editor" will be shown as below.

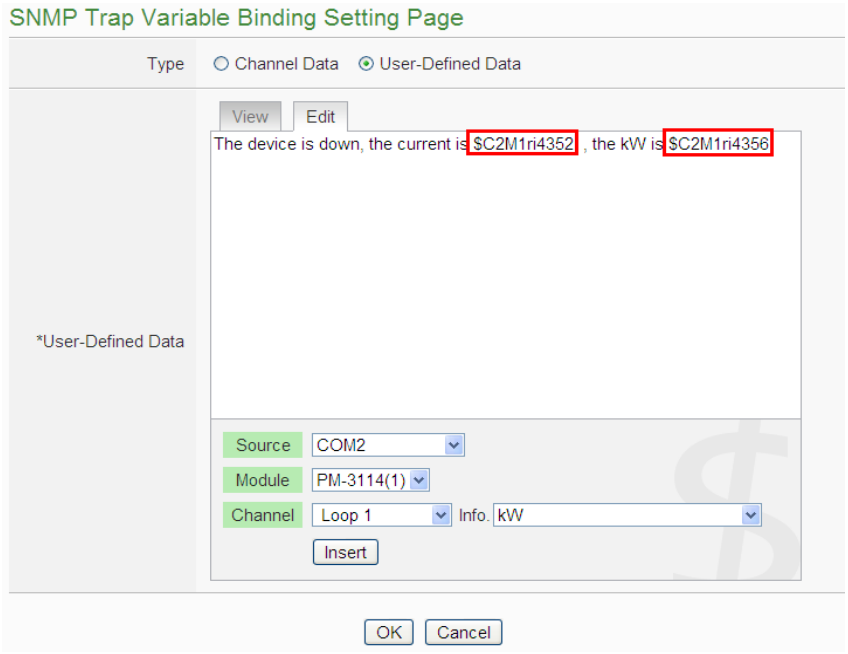


Figure9-17 : "User-Defined Data" Interface in Edit Mode

Input your message in the "User-Defined Data" field, and then select the "Source", "Module" and "Channel" from the dropdown list and click "Insert" to add channel value encoded string into the "User-Defined Data" content. The system will record the data the user pre-set in the User-Defined Data, and save the real data values in the SNMP Trap Variable Binding. When editing the content, the user can select the "View" tab, and then the channel encoded string will be displayed in the real index format of the channel for user to check the settings in an easy way.

The figure above (Figure9-17) shows an example of the encoded strings, the variable $C2M1ri4352 indicates the voltage value of PM-3114 Loop 1 on the module 1 that is connected to COM2, the variable $C2M1ri4356 indicates the kW value of PM-3114 Loop 1 on the module 1 that is connected to COM2. When users select the "View" tab, the channel value encoded string will be displayed as "PM-3114 Loop1 V" and "PM-3114 Loop1 kW" for user to check if the setting is appropriate (Figure9-18).

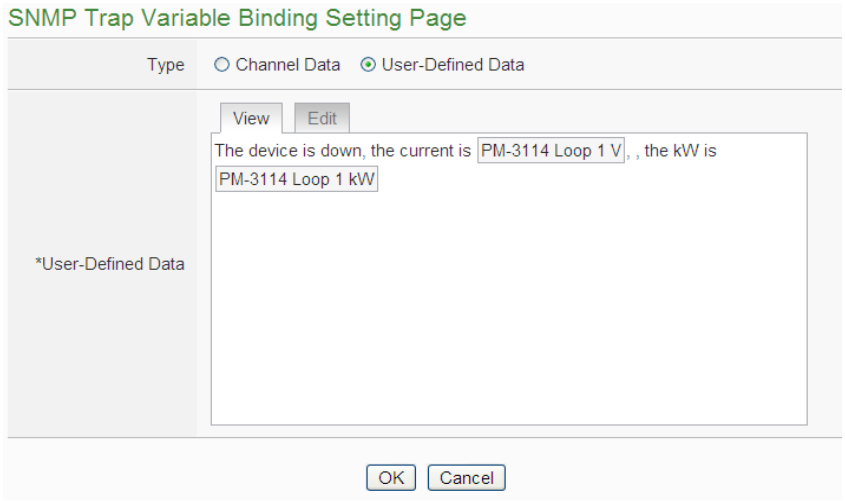


Figure9-18 : "User-Defined Data" Interface in View Mode

After completing the setting, click the "OK" button to save the parameters and variable bindings setting, and return to the SNMP Trap Setting Page

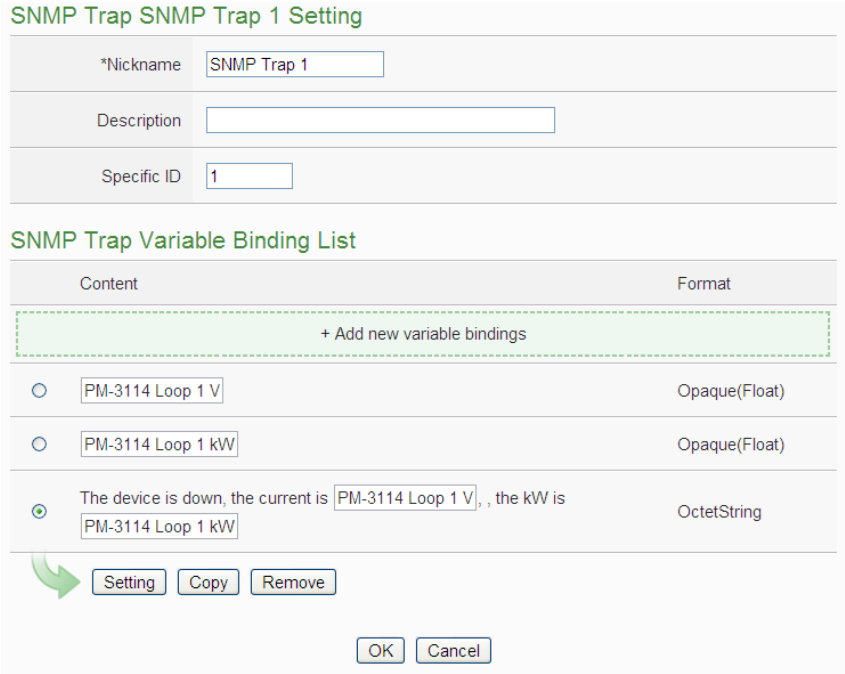


Figure9-19 : SNMP Trap setting with variable bindings list

viii To copy the settings of a pre-set SNMP Trap to the new SNMP Trap, please click the radio button in front of the pre-set SNMP Trap and then click "Copy", a new SNMP Trap (in sequence) will be added to the list and the settings of the old SNMP Trap will be copied to this newly added SNMP Trap.

ix To remove a pre-set SNMP Trap, please click the radio button in front of the pre-set SNMP Trap and then click “Remove”.

x After you finishing all the SNMP Traps creation and setting, click “Save” button to save the settings.

9.4 Timer Setting

PMC-5151 provides “Timer” for timing functions. The Timer status can be “Not Timeout” or “Timeout”. They can be included in the IF Condition statements. The Timer Action can be “Start” or “Reset”. The Start Action will start to run the Timer and if the Start Action is triggered one more time when the Timer is running, the Timer will restart again. The Reset action will reset the Timer and stop running the Timer. The Timer will be in “Timeout” status only when the Timer is running and reached the setting time, otherwise, the status of Timer will remain in “Not Timeout”.

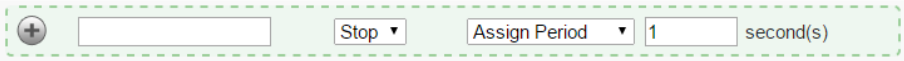
Follow the following steps：

i Input the nickname of the timer in the “Nickname” field.

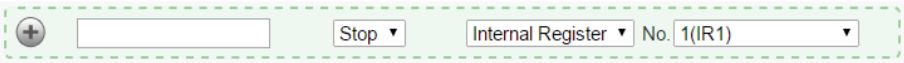
ii Specify the initial status of the timer from the dropdown list of the “Initial Status” field. The “Initial Status” could be “Stop” or “Start” status.

iii Specify the period interval in units of seconds. There are two modes to setup the period interval:

- Assign Period : Input the period interval in units of seconds manually。



- Internal Register：Assign the period interval as the value of selected internal register.



Please note: The user must setup internal register before using internal register as timer period. Please refer to ch 9.6 Internal Register Setting to setup internal register.

iv Click button to create a new Timer.

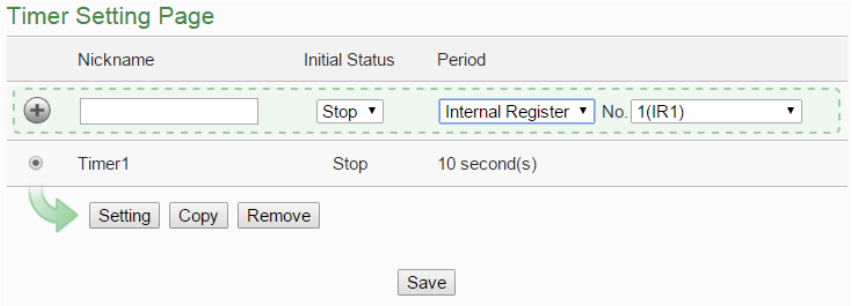


Figure9-20 : Timer creating Page

v Repeat steps i~iv to complete settings of all Timer.

vi To modify the settings of a pre-set timer, please click on the radio button in front of the timer, and then click on “Setting” to modify the settings. The setting user interface is as following:

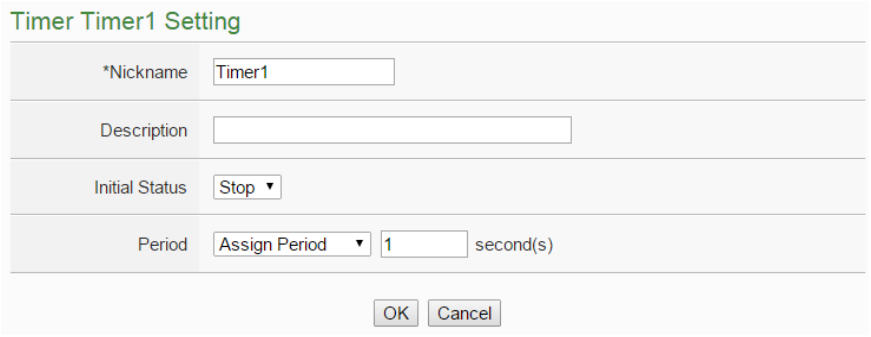


Figure9-21 : Timer setting Page(Assign Period)

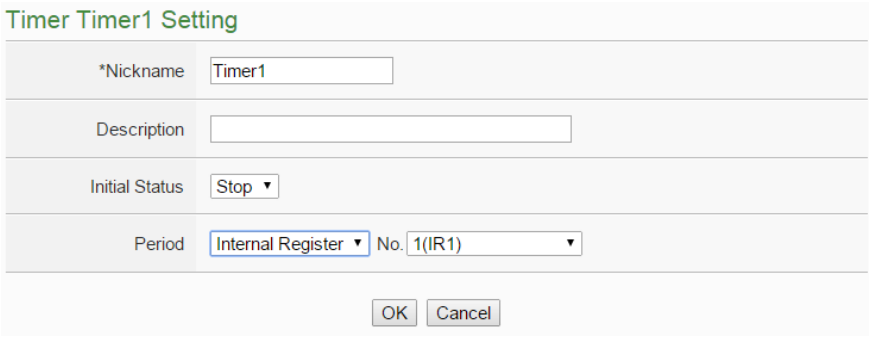


Figure9-22 : Timer setting page(Internal Register)

vii To copy the settings of a pre-set Timer to the new Timer, please click the radio button in front of the pre-set Timer and then click “Copy”, a new Timer (in sequence) will be added to the list and the settings of the old Timer will be copied to this newly added Timer.

viii To remove a pre-set Timer, please click the radio button in front of the pre-set Timer and then click “Remove”.

ix After all timer settings are completed, click “Save” button to save the changes.

9.5 Schedule Setting

PMC-5151 provides Schedules to setup prescheduled routine tasks. The setting of Schedule can be used to check if the system time of the PMC is in the range of date/time setting of the schedule or not. The checking status can be included in the IF Condition statements. Schedule setting page is shown as below:

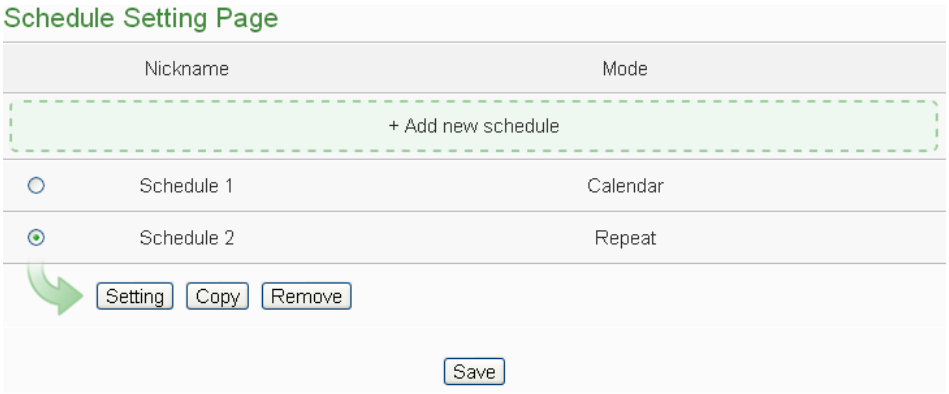


Figure9-23 : Schedule setting page

The settings steps are as below:

i Click on “Add new schedule” to add a new schedule.

ii After clicking the “Add new schedule”, a setting page will appear, input name in the “Name” field and you could also input the description of this schedule in the “Description” field.

iii Select Mode to be “Calendar” or “Repeat”.

- Calendar：

  (a.) In the “Date” field, select the “Starting Month” and “Duration” from the dropdown list. The maximum duration can be set is 12 months. After you specify the Year and Month in the Date section, the calendars corresponding to the Year and Month you specified will appear as shown below:

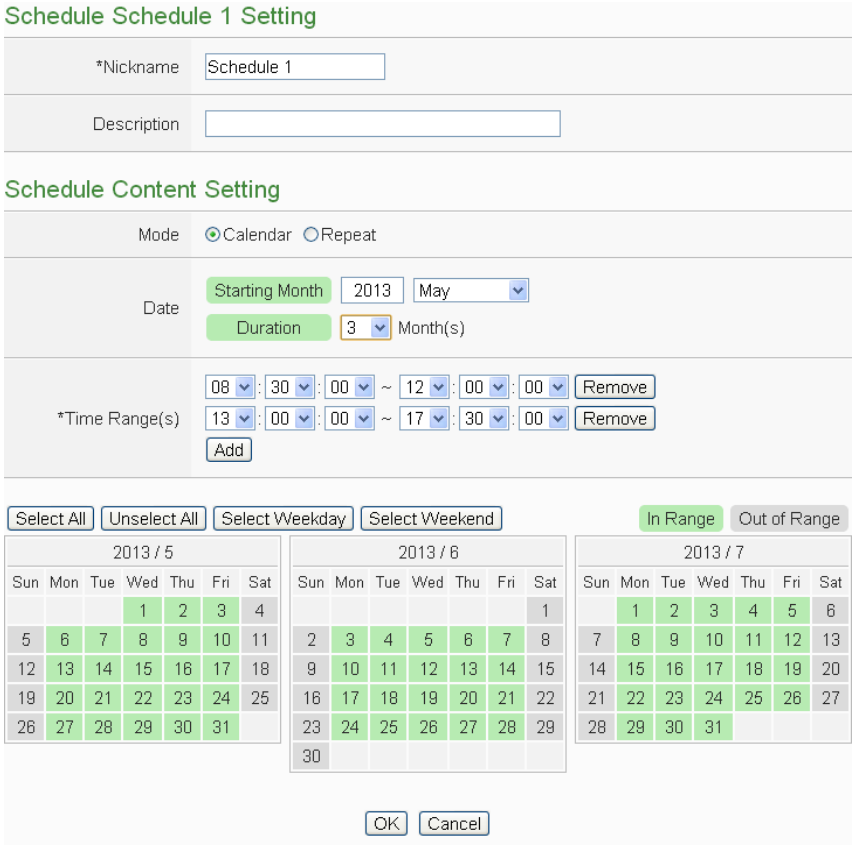


Figure9-24 : Calendar mode of Schedule setting

(b.) In the "Time Range(s)" section, click "Add" to add new Time Range to execute this schedule. Select the start time and the end time from the dropdown list. Each Schedule is required to set at least one Time Range; click on "Add" to add more Time Range. Please note: the time zones you specified can't be overlapped. If you specify an end time that is earlier than the start time, such as 20:00:00 ~ 06:00:00, it indicates the end time will be set one day after the start date. Click "Remove" to remove a pre-set Time Range.

(c.) On the calendars, click to toggle highlight on the dates you'd like to execute or not execute the operations for this Schedule. If the date shows a light green background, it indicates the date is "In Range" of the schedule, that is, that date falls into the range that will execute the operations. On the contrary, if the date shows a light grey background, it indicates that date is "Out of Range" of the schedule, that is, that date falls out of the range and will not execute the operations. By default, all dates will be "In Range", that is, during the date range you select, the

operation will be executed every day. "Select All" button is used to set all dates to be "In Range"; whereas "Unselect All" button is for marking all dates to be "Out of Range". The Weekday button is for you to select all Mondays to Fridays to be "In Range", and Saturdays and Sundays to be "Out of Range", that is, the operations will be executed during weekdays only. On the contrary, the Weekend button is for you to set all Saturdays and Sundays to be "In Range", and all Mondays to Fridays to be "Out of Range", that is, the operations will be executed during weekends only.

- Repeat：

(a.) In the "Day(s) of week" section, click on the day(s) in a week that is going to execute the schedule; shown as below:

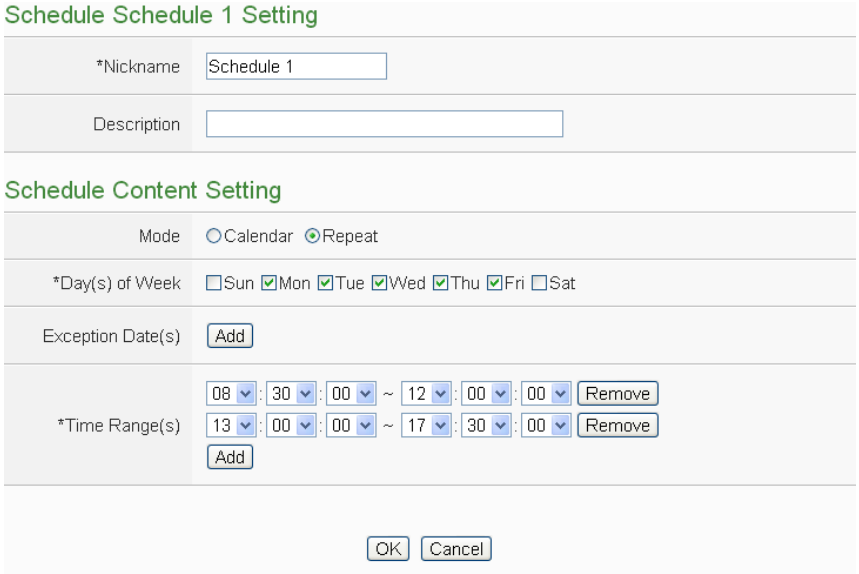


Figure9-25 : Repeat mode of Schedule setting

(b.) In the "Exception Date(s)" selection, click on "Add" to add the date(s) that is/are not going to execute the schedule. Click "Remove" to remove a pre-set Exception Date.

(c.) In the "Time Range(s)" section, click "Add" to add new Time Range to execute this schedule. Select the start time and the end time from the dropdown list. Each Schedule is required to set at least one Time Range; click on "Add" to add more Time Range. Please note: the time zones you specified can't be overlapped. If you specify an end time that is earlier than the start time, such as 20:00:00 ~ 06:00:00, it indicates the end time will be set one

day after the start date. Click “Remove” to remove a pre-set Time Range.

iv Click on “OK” to confirm the setting and leave the setting page.

v Repeat steps i~iv to complete settings of all Schedule.

vi To modify the settings of a pre-set Schedule, please click on the radio button in front of the Schedule, and then click on “Setting” to modify the settings.

vii To copy the settings of a pre-set Schedule to the new Schedule, please click the radio button in front of the pre-set Schedule and then click “Copy”, a new Schedule (in sequence) will be added to the list and the settings of the old Schedule will be copied to this newly added Schedule.

viii To remove a pre-set Schedule, please click the radio button in front of the pre-set Schedule and then click “Remove”.

ix After all schedule settings are completed, click “Save” button to save the changes.

9.6 PUE Setting

PMC-5151 provides 10 PUEs; The configuration is shown as below:

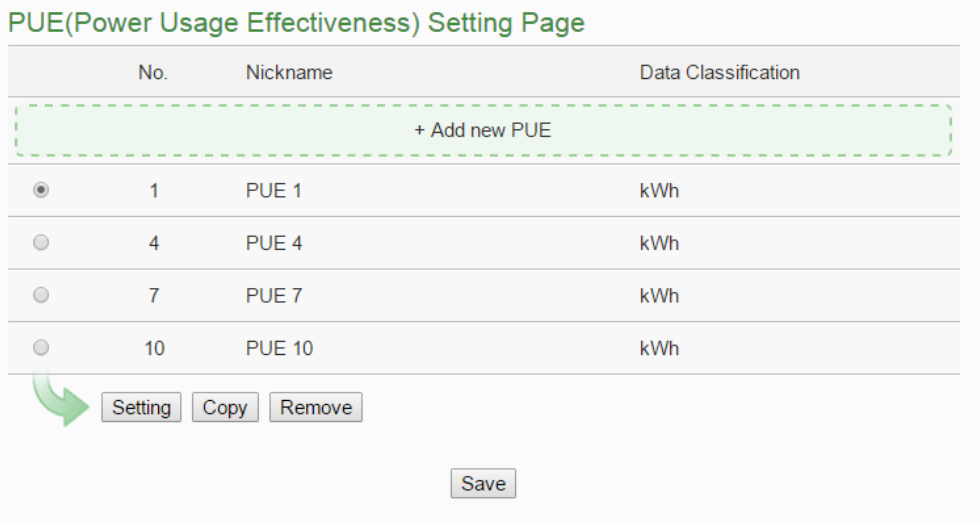


Figure9-26 : PUE Setting Page(1)

The settings steps are as below:

i Click on "Add new PUE" to add a new PUE option.

ii After clicking the “Add new PUE”, a setting page will appear, select the number of the PUE from the dropdown list, input name in the “Name” field and you could also input the description of this PUE in the “Description” field.

iii Setup the calculation expressions of the "Total Facility Energy", and users can click "add" button to modify the expressions.

iv Setup the calculation expressions of the "IT Equipment Energy", and users can click "add" button to modify the expressions

v Select the "Data Classification" of the PUE.

vi Setup the maximum display value of the chart on the main page.

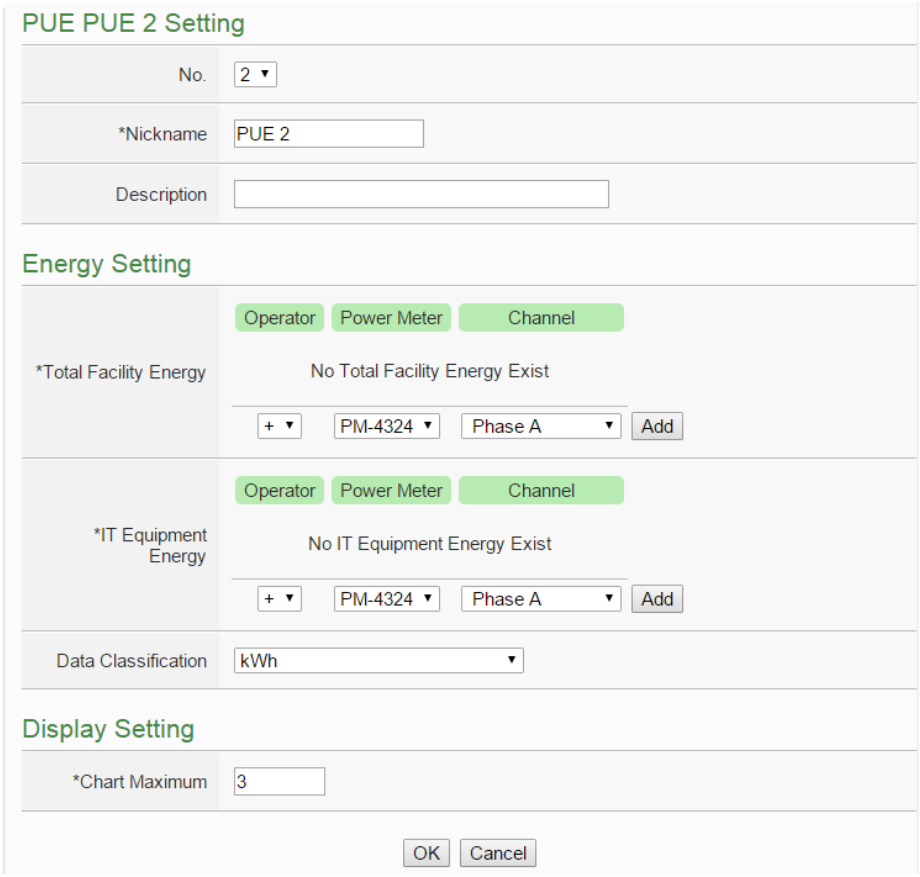


Figure9-27 : PUE Setting Page(2)

9.7 Internal Register Setting

PMC-5151 provides 48 Internal Registers; they can be used to hold temporary variables and to read/write data via Modbus address. The configuration page is shown as follow.

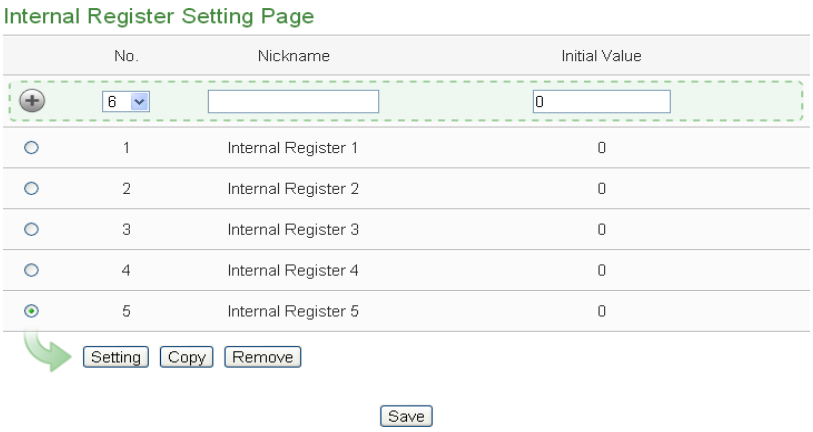


Figure9-28 : Internal Register setting page(1)

The settings steps are as below:

ii Select the number of the Internal Register from the dropdown list, input "Name" and "Initial Value" and then click to add new Internal Register.

Please Note: there are up to 48 Internal Register can be enabled, if the name of the register is not inputted, the name will be automatically set as "Internal Register#"(#is the number of the register), the default initial value will be set as 0.

ii To modify the settings of a pre-set internal register, please click on the radio button in front of the register, and then click on "Setting" to modify the settings.

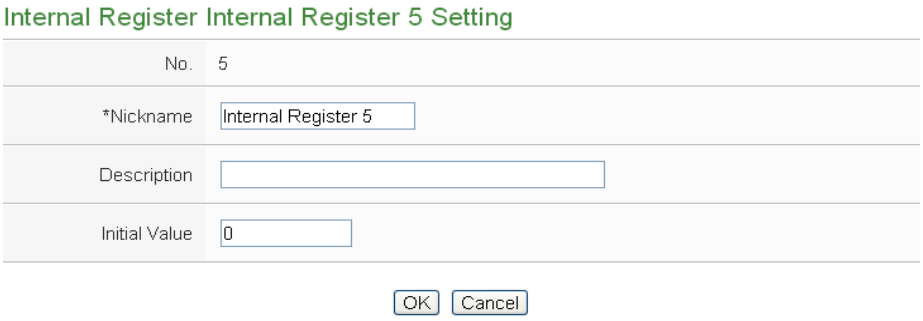


Figure9-29 : Internal Register setting page(2)

iii To copy the settings of a pre-set internal register to the new internal register, please click the radio button in front of the pre-set internal register and then click "Copy", a new internal register(in sequence) will be added to the list and the settings of the old internal register will be copied to this newly added internal register.

iv To remove a pre-set internal register, please click the radio button in front of the pre-set internal register and then click "Remove".

- After you finish all the Internal Registers selections and settings, click “Save” button to save the settings.

9.8 Flash HMI Setting

Please refer to the document: Flash HMI Tools Quick Start.

10 Rules Setting

After finishing all Advanced Setting configurations, you can start to edit IF-THEN-ELSE rules. Click the “Rules Setting” button, a list of rules will be displayed on the left side of the page, and at the right side of the page will show detailed content of each rule that was previously defined. The rule setting page is shown as below:

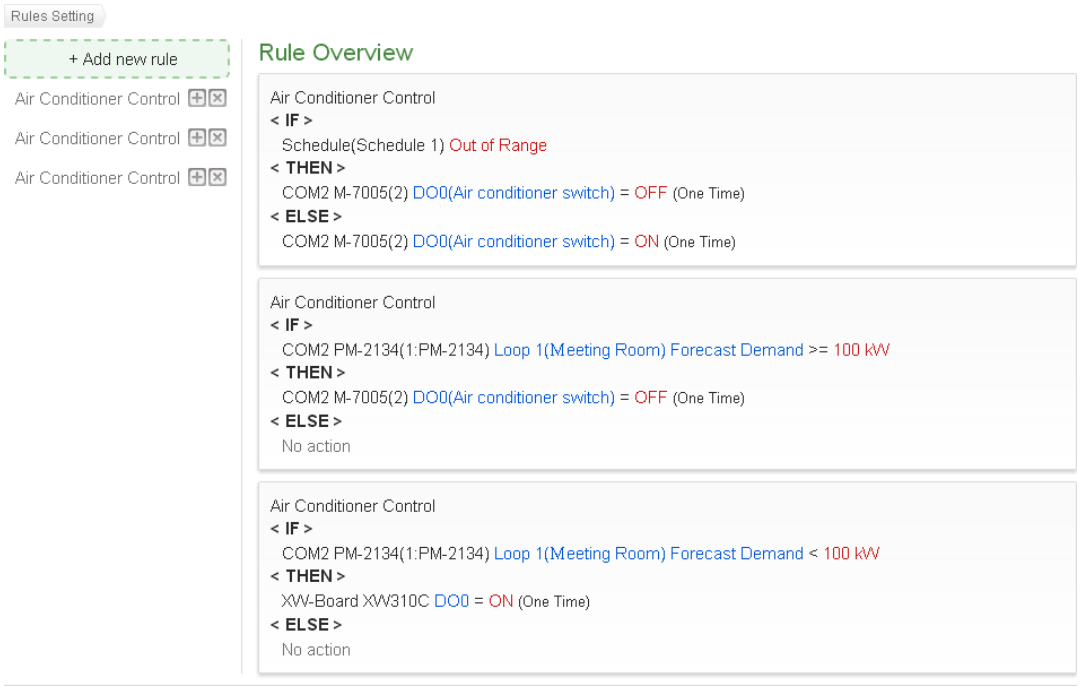

Rules Setting
+ Add new rule
Air Conditioner Control
Air Conditioner Control
Air Conditioner Control
Rule Overview
Air Conditioner Control
< IF >
Schedule(Schedule 1) Out of Range
< THEN >
COM2 M-7005(2) DO0(Air conditioner switch) = OFF (One Time)
< ELSE >
COM2 M-7005(2) DO0(Air conditioner switch) = ON (One Time)
Air Conditioner Control
< IF >
COM2 PM-2134(1:PM-2134) Loop 1(Meeting Room) Forecast Demand >= 100 kW
< THEN >
COM2 M-7005(2) DO0(Air conditioner switch) = OFF (One Time)
< ELSE >
No action
Air Conditioner Control
< IF >
COM2 PM-2134(1:PM-2134) Loop 1(Meeting Room) Forecast Demand < 100 kW
< THEN >
XW-Board XW310C DO0 = ON (One Time)
< ELSE >
No action

Figure10-1 : Rules overview page

In addition to the list of the rules, Rule Management interface will also be shown on the left side of the page. Detailed description is as below:

- **Add new rule**：To add a new rule, please click “Add new rule”.
- **Copy**：To copy the settings of an old rule to the new rule, please click on the button on the right side of the old rule, a new rule will be added to the list and the settings of the old rule will be copied to this newly added rule.
- **Remove**：To remove a pre-set rule, please click on the button on the right side of the pre-set rule.
- **Arrange the order**：Right click on the pre-set rule and drag them up or down to arrange the rules into the proper order.

Click “Add new rule” to get into the “Rule Information Setting” page for logic rule edition (shown as below).

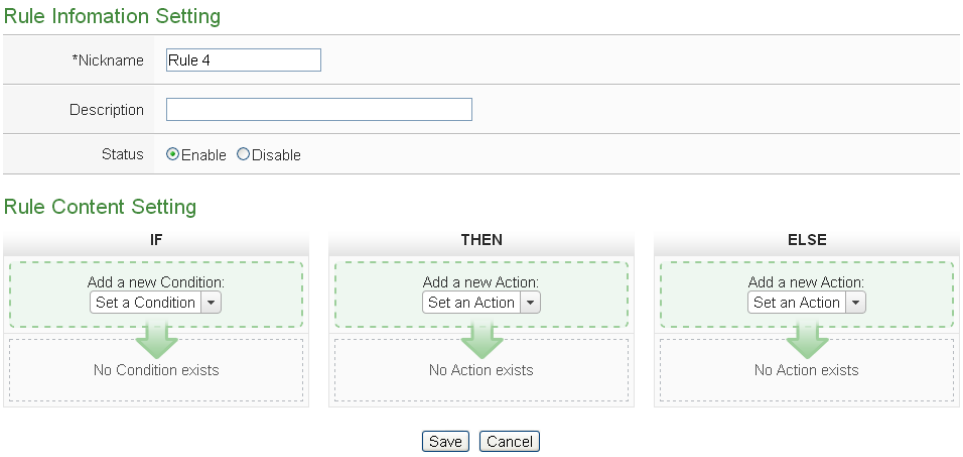


Figure10-2 : Rules setting page

- **Nickname**: Input name in the "Nickname" field and you could also input the description of this Rule in the "**Description**" field.
- **Status**: Select "Enable" or "Disable". If you select "Enable", the rule will be executed after being downloaded. If you select "Disable" the rule will only be stored temporarily and will not be executed after being downloaded.
- **IF Condition Setting**: More detailed information, please refer to 10.1 IF Condition.
- **THEN/ELSE Action Setting**: More detailed information, please refer to 10.2 THEN/ELSE Action.
- **Save**: After finish all IF Condition and THEN/ELSE Action setting, click on "Save" to save the settings.
  Please note: if you make modification in Power meter setting, IO module setting or in Advanced Setting after finish defining the rules, it might cause unexpected error due to the changes, some variables may no longer exist. Therefore, in case you make any modification, please double check your settings and Rules definition to make sure no errors are present.

When user finish settings of an IF Condition or THEN/ELSE Action, after going back to the Rule Information Setting page, a function component will be displayed under the IF Condition or THEN/ELSE Action section(shown as below), the function component will display the settings information of the IF-THEN-ELSE logic rule.

The function component (IF Condition, THEN Action or ELSE Action) provides various functions such as:

- **Setting**: to edit a pre-set function component, click on to get in to the setting page of the function component.
- **Copy**: to copy a pre-set function component, click on to generate a new component with the same pre-set component settings. The new function component will be listed under the pre-set component.
- **Remove**: to remove a pre-set function component, click on to remove the component.
- **Arrange order**: the order of the function component might result in different outcomes of IF-THEN- ELSE rule execution, therefore, user could click on and drag the component to arrange the components into appropriate order.

The following section will give more detailed information of IF Condition and THEN/ELSE Action settings.

10.1 IF Condition Setting

To add an IF Condition, please select and set the Condition from the dropdown list in the “Add a new Condition” field under the IF Condition setting section.

IF Condition provides the following Condition setting options:

- ICP DAS Module
- Modbus Module
- Power Meter
- Connection Status
- Timer
- Schedule
- FTP Upload Status
- SD Card Status
- Rule Status
- Internal Register

If the PMC-5151 is connected to ICP DAS XW-Board/M-7000 I/O modules, ICP DAS power meters or Modbus TCP/RTU modules, the setting options for I/O channel information (AI, DI, Discrete Input, Coil Output, Input Register and Holding Register) or power data on these modules will be automatically displayed on the dropdown list.

To include subjects other than modules mentioned above in the IF Condition statement; they have to be pre-defined in Advanced Setting first.

The setting options of the subjects that already being defined in Advanced Setting will appear on the dropdown list of IF Condition. Select the Condition option from the dropdown list in the "Add a new Condition" field under the IF Condition setting section, a window will pop up for you to edit detailed information. The setting options of IF Condition are as follow:

10.1.1 ICP DAS Module

Click on ICP DAS Module (XW-Board/M-7000), 3 options will appear as the following: DI, DI Counter, and AI.

10.1.1.1 DI

DI channel value from XW-Board or M-7000 module can be used as evaluation criteria for IF condition statement; the setting page for DI Condition Setting is shown as below:

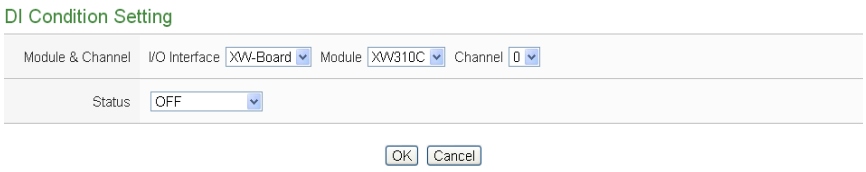


Figure10-3 : DI condition setting page

Follow the steps below:

i Specify the module and channel from the dropdown list of the "Module & Channel" section that you are going to include its value in the IF condition statements.

ii Define the evaluation criteria of the status in IF statement to be "OFF", "ON", "ON to OFF", "OFF to ON" or "Change". Once the DI channel value matches the evaluation criteria, the result of this condition evaluation will be "true". Please note: If the statement involves state transitions: "ON to OFF", "OFF to ON" and "Change", the action will be executed only once and only at the moment when the state transition occurs.

iii Click "OK" button to confirm the settings and return to the Rule settings page.

10.1.1.2 DI Counter

DI counter value from XW-Board or M-7000 module can be used as evaluation criteria for IF condition statement; the editing page for DI Counter Condition Setting is shown as follow:

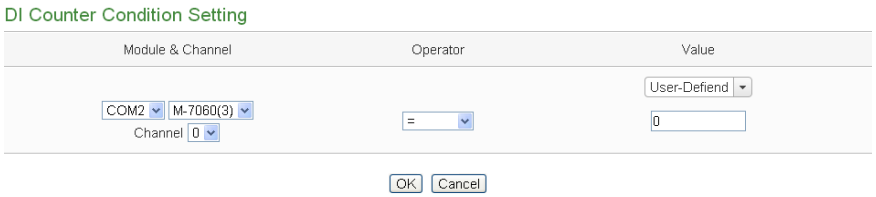


Figure10-4 : DI Counter condition setting page

Follow the steps below:

i Specify the module and channel from the dropdown list of the "Module & Channel" section that you are going to include its value in the IF condition statements.

ii Set up the expression statement for this counter value. Select an operator from "=",">","<",">=","<=" or "Change".

iii Set up the value for comparison; select the value from the dropdown list to be "User-Defined" or "Internal Register". If "User-Defined" is selected, input the "User-Defined" value under the "Value" section. If "Internal Register" is selected, select the number of the Internal Register from the dropdown list. If the DI counter value match the evaluation criteria, the result of this condition evaluation will be "true". If the operator is "Change", there is no need to set the comparison value; the condition will be "true" when there is a change to the counter value. The action will be executed only once and only at the moment when DI Counter experience a change.

iv Click "OK" button to confirm the settings and return to the Rule settings page.

10.1.1.3 AI

AI channel value from XW-Board or M-7000 module can be included in the IF condition statements; the editing page for AI Condition Setting is shown as below:

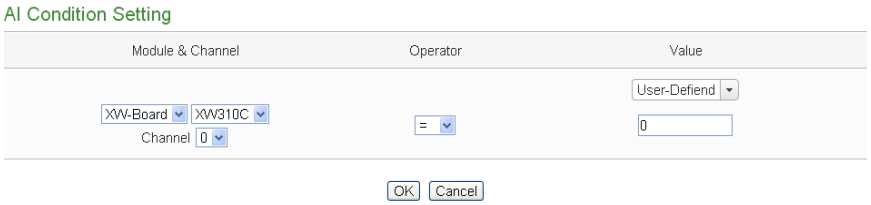


Figure10-5 : AI condition setting page

Follow the steps below:

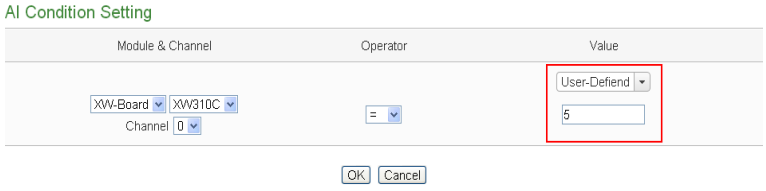
i Specify the module and channel from the dropdown list of the "Module & Channel" section that you are going to include its value in the IF condition statements.

ii Set up the expression statement for this channel value. Select an operator from "=",">","<",">=" or "<=".

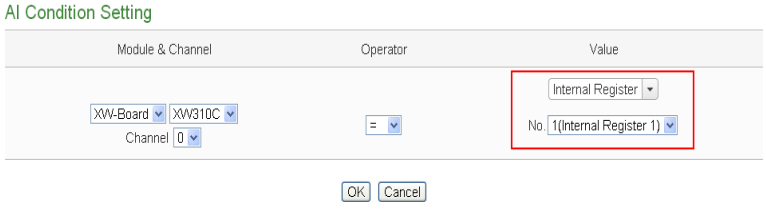
iii And then specify the evaluation value. If this AI channel value match the evaluation criteria, the result of this condition evaluation will be "true".

iv PMC-5151 provides the following 7 values options; you can compare them with the AI channel value for condition evaluation:

- User-Defined: The "User-Defined" value could be used as evaluation criteria; input the "User-Defined" value under the "Value" field.

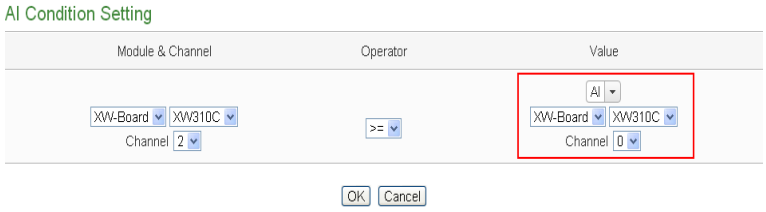


- Internal Register: The "Internal Register" value could be used as evaluation criteria; select the number of the Internal Register from the dropdown list.

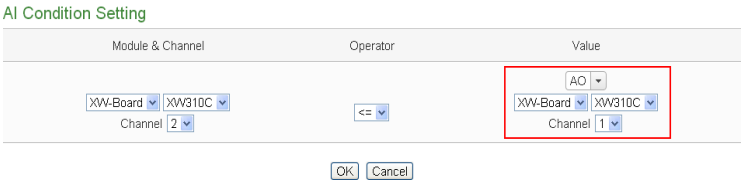


- The AI channel value from other ICP DAS modules(such as: XW-Board or M-7000) could be used as evaluation criteria; select the module and channel from the dropdown list to

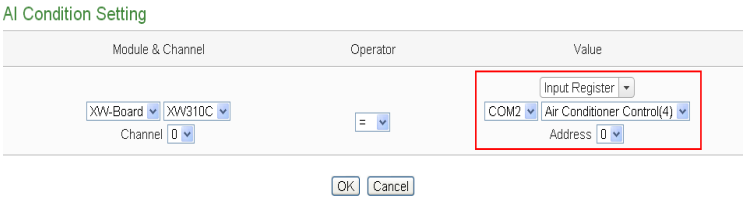
specify which channel value will be used.



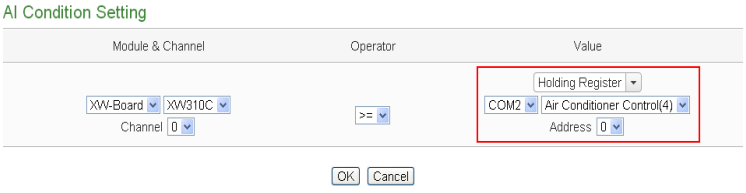
- The AO channel value from other ICP DAS modules(such as: XW-Board or M-7000) could be used as evaluation criteria; select the module and channel from the dropdown list to specify which channel value will be used.



- The Input Register value from other Modbus RTU/TCP Slave modules could be used as evaluation criteria; select the module and channel from the dropdown list to specify which channel value will be used.

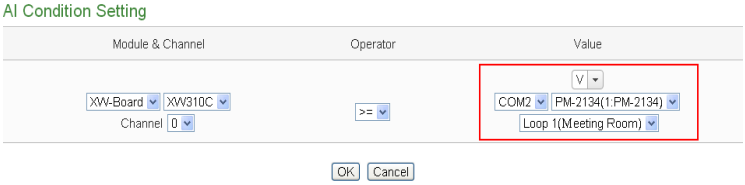


- Holding Register: The Holding Register value from other Modbus RTU/TCP Slave modules could be used as evaluation criteria; select the module and channel from the dropdown list to specify which channel value will be used.



- Power Meter: The power data of the Power Meter could be used as evaluation criteria; select the power data from the dropdown list: V, I, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Actual Demand, Forecast Demand, Hourly Maximum Demand, Daily Maximum Demand, Monthly Maximum Demand, Daily Accumulated Electricity, Monthly Accumulated Electricity and Yearly Accumulated Electricity.

And then select module and channel from the dropdown list to specify which power meter and loop(or phase) value will be used.



v Click “OK” button to confirm the settings and return to the Rule settings page.

10.1.2 Modbus Module

Click on “Modbus Module”, 4 options will appear as the following: Discrete Input, Coil Output, Input Register and Holding Register.

10.1.2.1 Discrete Input

Discrete Input channel value from Modbus TCP/RTU Slave module can be included in the IF condition statements; the editing page for Discrete Input Condition Setting is shown as below:

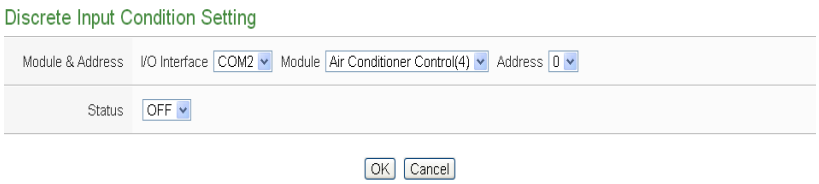


Figure10-6 : Discrete Input condition setting page

Follow the steps below:

i Specify the module and address of the Modbus TCP/RTU Slave module from the dropdown list of the “Module & Address” section that you are going to include its value in the IF condition statements.

ii Define the evaluation criteria of the status in IF statement to be “OFF” or “ON”.

iii Click “OK” button to confirm the settings and return to the Rule settings page.

10.1.2.2 Coil Output

Coil Output channel value from Modbus TCP/RTU Slave module

can be included in the IF condition statements; the editing page for Coil Output Condition Setting is shown as below:

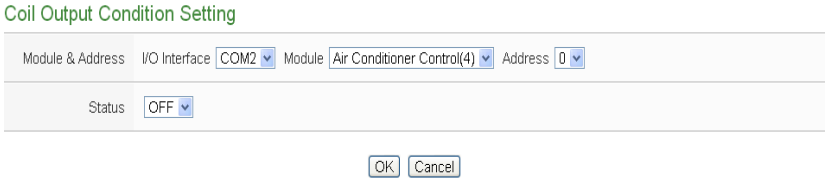


Figure10-7 : Coil Output condition setting page

Follow the steps below:

i Specify the module and address of the Modbus TCP/RTU Slave module from the dropdown list of the "Module & Address" section that you are going to include its value in the IF condition statements.

ii Define the evaluation criteria of the status in IF statement to be "OFF" or "ON".

iii Click "OK" button to confirm the settings and return to the Rule settings page.

10.1.2.3 Input Register

Input Register channel value from Modbus TCP/RTU Slave module can be included in the IF condition statements; the editing page for Input Register Condition Setting is shown as below:

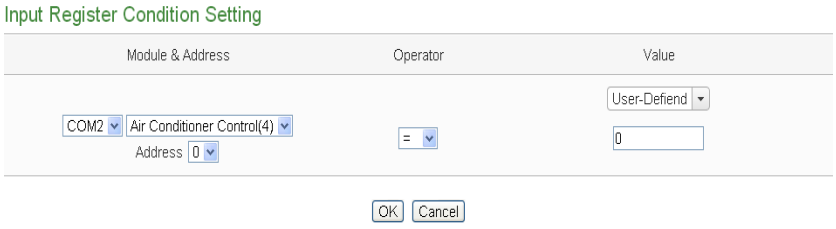


Figure10-8 : Input Register condition setting page

Follow the steps below:

i Specify the module and address of the Modbus TCP/RTU Slave module from the dropdown list of the "Module & Address" section that you are going to include its value in the IF condition statements.

ii Set up the expression statement for this Input Register address value. Select an operator from "=",">","<",">=" or "<=".

iii And then specify the evaluation value. If this Input Register

value match the evaluation criteria, the result of this condition evaluation will be “true”.

iv PMC-5151 provides 7 value options; you can compare them with the Input Register value for condition evaluation. Please refer to “10.1.1.3” section for more detailed information for comparison value settings of these 7 options.

v Click “OK” button to confirm the settings and return to the Rule settings page.

10.1.2.4 Holding Register

Holding Register channel value from Modbus TCP/RTU Slave module can be included in the IF condition statements; the editing page for Holding Register Condition Setting is shown as below:

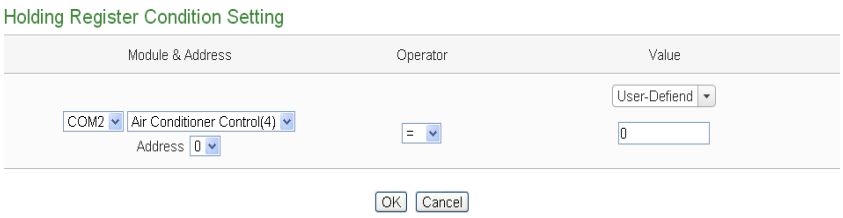


Figure10-9 : Holding Register condition setting page

Follow the steps below:

i Specify the module and address of the Modbus TCP/RTU Slave module from the dropdown list of the “Module & Address” section that you are going to include its value in the IF condition statements.

ii Set up the expression statement for this Holding Register address value. Select an operator from “=”,”>”,”<”,”>=” or “<=”.

iii And then specify the evaluation value. If this Holding Register value match the evaluation criteria, the result of this condition evaluation will be “true”.

iv PMC-5151 provides 7 value options; you can compare them with the Holding Register value for condition evaluation. Please refer to “10.1.1.3” section for more detailed information for comparison value settings of these 7 options.

v Click “OK” button to confirm the settings and return to the Rule settings page.

10.1.3 Power Meter

The power data of the Power Meter could be used as evaluation criteria; the power data options are as follow: V, I, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Actual Demand, Forecast Demand, Hourly Maximum Demand, Daily Maximum Demand, Monthly Maximum Demand, Daily Total Electricity, Monthly Total Electricity and Yearly Total Electricity. The setting page for Power Meter Condition Setting is shown as below:

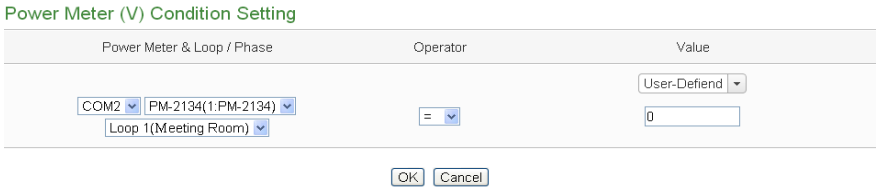


Figure10-10 : Power Meter condition setting page

Select which power data of the Power Meter is going to be used and then continue the following steps (taking option V as an example):

i Specify the power meter and loop/phase from the dropdown list of the “Module & Address” section that you are going to include its value in the IF condition statements.

ii Set up the expression statement for this power data value of the Power Meter. Select an operator from “=”,”>”,”<”,”>=” or “<=”.

iii And then specify the evaluation value. If this power data value of the Power Meter match the evaluation criteria, the result of this condition evaluation will be “true”.

iv PMC-5151 provides 7 value options; you can compare them with the power data value of the Power Meter for condition evaluation. Please refer to “10.1.1.3” section for more detailed information for comparison value settings of these 7 options.

v Click “OK” button to confirm the settings and return to the Rule settings page.

10.1.4 Connection Status

Connection Status can be included in the IF condition statements; the editing page for Connection Status Condition Setting is shown as below:

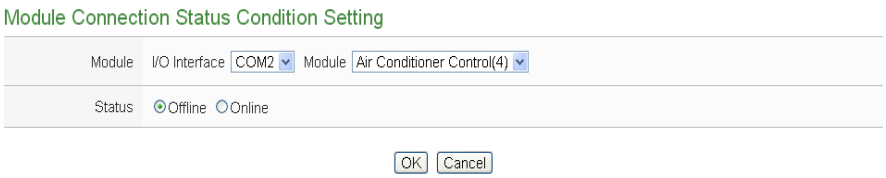


Figure10-11 : Connection Status condition setting page

Follow the steps below:

i Specify the module from the dropdown list of the “Module” section that you are going to include its Connection Status in the IF condition statements.

ii And then specify the Connection Status to be “Offline” or “Online”. If the Connection Status of the module match the evaluation criteria, the result of this condition evaluation will be “true”.

iii Click “OK” button to confirm the settings and return to the Rule settings page.

10.1.5 Timer

Timer condition can be used as evaluation criteria for IF condition statement; the editing page for timer condition setting is shown as follow:

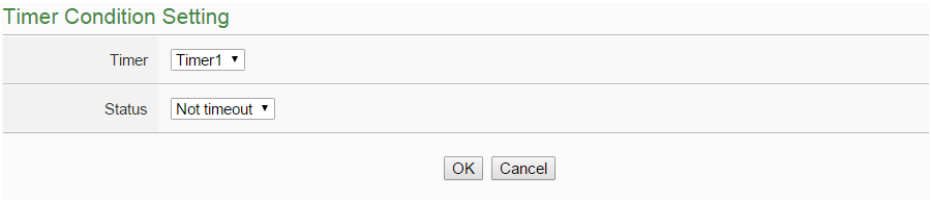


Figure10-12 : Timer condition setting page

Follow the following steps:

i Select the timer that you are going to use its status as evaluation criteria for IF condition statement. Specify the timer from the dropdown list of the “Timer” field.

ii Define the evaluation criteria of the timer status in IF statement to be “Not timeout” or “Timeout”. If the timer status match the evaluation criteria, the result of this condition evaluation will be “true”.

iii Click “OK” button to save the settings. The popup window will be closed and return to the Rule settings page.

10.1.6 Schedule

The Schedule can be used as evaluation criteria for IF condition statement; the editing page for Schedule Condition Setting is shown as follow:

Figure10-13 : Schedule condition setting page

Follow the steps below:

i Select the Schedule that you are going to use for IF condition statement from the dropdown list of "Schedule" field.

ii The "Status" field must be "In Range". If the system time of the PMC is in the range of date/time setting of the schedule, the result of this condition evaluation will be "true".

iii Click "OK" button to confirm the settings and return to the Rule settings page.

10.1.7 FTP Upload Status

The status of FTP Upload Status can be used as evaluation criteria for IF condition statement; the editing page for FTP Upload Status Condition Setting is shown as follow:

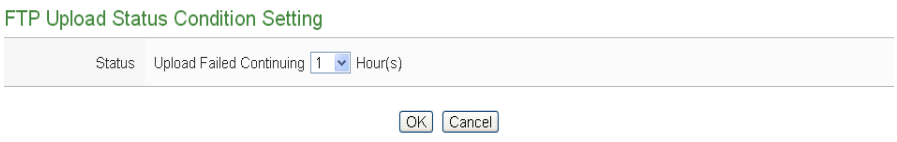


Figure10-14 : FTP Upload Status condition setting page

Follow the steps below:

ii In the "Status" field, set up the maximum allowable idle time period when fails to upload files via FTP; once the time period reaches the maximum allowable idle time period, the result of this condition evaluation will be "true".

iii Click "OK" button to confirm the settings and return to the Rule settings page.

10.1.8 SD Card Status

The status of SD Card can be used as evaluation criteria for IF condition statement; the editing page for SD Card Status Condition Setting is shown as follow:

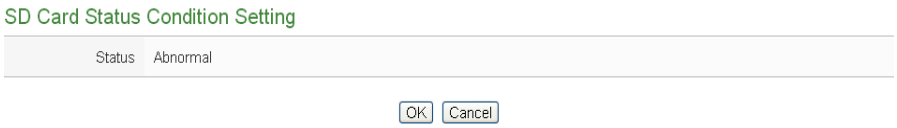


Figure10-15 : SD Card Status condition setting page

Follow the steps below:

i When the status of micro SD Card appears irregular (micro SD Card is not detected or the space is less than 100MB), the result of this condition evaluation will be “true” Click “OK” button to confirm the settings and return to the Rule settings page.

10.1.9 Rule Status

The Rule Status (if the Rule is disabled or enabled) can be used as evaluation criteria for IF condition statement. Please note: there must be at least one edited rule on PMC-5151 controller for setting up Rule Status in the IF Condition Setting page. The editing page for Rule Status Condition Setting is shown as below:

Figure10-16 : Rule Status condition setting page

Follow the steps below:

i Specify the Rule that is going to be used in the IF Condition statement from the dropdown list of the “Rule” field.

ii Specify the Rule status to be “Disable” or “Enable” from the dropdown list of the “Status” field. When the Rule status matches the specified status, the evaluation result will be “true”.

iii Click “OK” button to confirm the settings and return to the Rule settings page.

10.1.10 Internal Register

Internal Register value can be used as evaluation criteria for IF condition statement; the editing page for Internal Register Condition Setting is shown as follow:

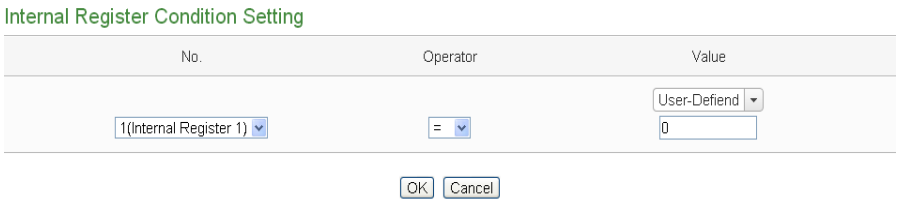


Figure10-17 : Internal register condition setting page

Follow the steps below:

i Select the Internal Register that you are going to use the value as evaluation criteria for IF condition statement. Specify the Internal Register Index from the dropdown list of "No." field.

ii Set up the expression statement for this Internal Register value. Select an operator from "=",">","<",">=" or "<=".

iii And then specify the evaluation value. If this Internal Register value match the evaluation criteria, the result of this condition evaluation will be "true".

iv PMC-5151 provides 7 value options; you can compare them with the Input Register value for condition evaluation. Please refer to "10.1.1.3" section for more detailed information for comparison value settings of these 7 options.

v Click "OK" button to confirm the settings and return to the Rule settings page.

10.2 THEN/ELSE Action Setting

To add a THEN/ELSE Action, please select and set the Action from the dropdown list in the "Add a new Action" field under the THEN/ELSE Action setting section.

- ICP DAS Module
- Modbus Module
- Power Meter
- Timer
- Email

- SMS Alarm
- SNMP Trap
- Data Logger
- Rule Status
- Internal Register

If the PMC-5151 is connected to ICP DAS XW-Board/M-7000 I/O modules, ICP DAS power meters or Modbus TCP/RTU modules, the setting options for I/O channel information (AO、DO、Coil Output 和 Holding Register) will be automatically displayed on the dropdown list.

To include subjects other than modules mentioned above in the THEN/ELSE Action statement; they have to be pre-defined in Advanced Setting first. The setting options of the subjects that already being defined in Advanced Setting will appear on the dropdown list of THEN/ELSE Action. Select the Action option from the dropdown list in the "Add a new Action" field under the THEN/ELSE Action setting section, a window will pop up for you to edit detailed information. The THEN Action statement will be executed only when the result of IF condition statement is found "true"; otherwise the ELSE Action statement will be executed. In order to meet application requirement, for some Actions, PMC-5151 offers options to execute the Action one-time or repeatedly. The setting options of THEN/ELSE Action are as follow:

- One-Time: when the IF Condition is TRUE, this Action will be executed once and only once. This Action will not be executed again until the IF Condition turns to be TRUE again.
- Repeat: when the IF Condition is TRUE, this Action will be executed repeatedly until the IF Condition turns to be FALSE.

The setting options of THEN/ELSE Action are as follow:

10.2.1 ICP DAS Module

Click on ICP DAS Module(XW-Board/M-7000), 3 options will appear as the following: DI Counter, DO, and AO.

10.2.1.1 DI Counter

You can reset DI counter of the XW-Board/ M-7000 modules in the THEN/ELSE Action statement; the editing page for DI counter Action is shown as follow:

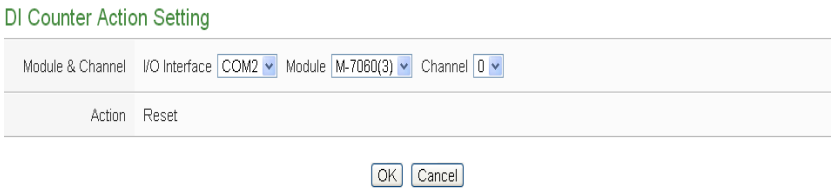


Figure10-18 : DI Counter action setting page

Follow the steps below:

i Select the DI channel to reset DI counter from the dropdown list of channel field in the "Module & Channel" section.

ii Click "OK" button to confirm the settings and return to the Rule settings page.

10.2.1.2 DO

You can execute an action in DO channel of XW-Board or M-7000 module in the THEN/ELSE Action statement; the editing page for DO Action is shown as follow:

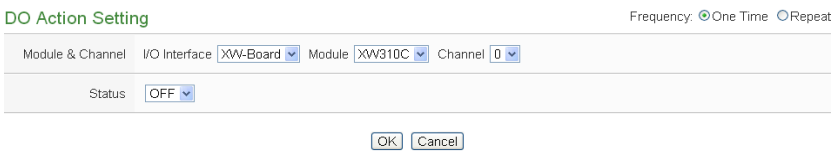


Figure10-19 : DO action setting page

Follow the steps below:

i Specify the module and channel from the dropdown list of the "Module & Channel" section.

ii Specify the output value of DO Channel from the dropdown list of the "Status" field. The output value can be "OFF", "ON" or "Pulse Output" (Pulse Output applies to XW-Board only). For M-7088 belongs to PWM (Pulse width modulation) modules, the DO channel Action will be "Start PWM" or "Stop PWM".

iii Specify the "Frequency" to be "One-Time" or "Repeat".

iv Click "OK" button to confirm the settings and return to the Rule settings page.

10.2.1.3 AO

You can execute an action in AO channel of XW-Board or M-7000 module in THEN/ELSE Action statement; the editing page for AO

Action is shown as follow:

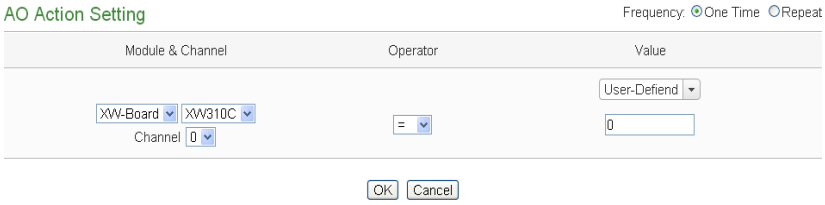


Figure10-20 : AO action setting page

Follow the steps below:

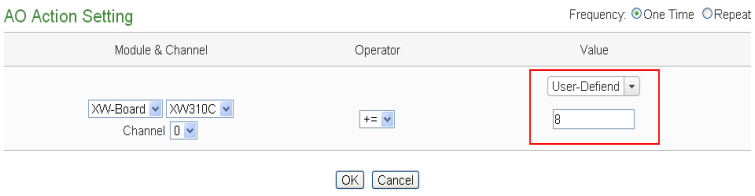
i From the dropdown list of the "Module & Channel" field, select the AO channel to execute actions.

ii Specify the Operator to be "=", "+=", or "-=" from the dropdown list in the "Operator" field. The 3 operators are as follow：

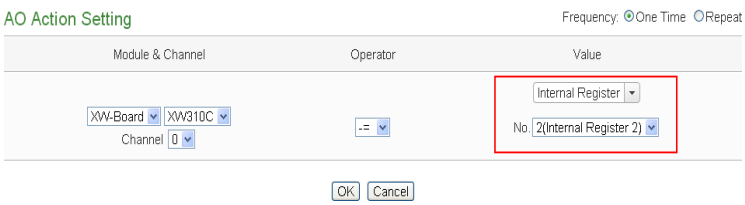
- "=" : Indicate assign the new AO channel value as the value in "Value" field
- "+=" : Indicate assign the new AO channel value as the original AO channel value plus the value in "Value" field.
- "-=" : Indicate assign the new AO channel value as the original AO channel value minus the value in "Value" field.

iii Set up the value in the "Value" field, PMC-5151 provides the following 7 value options to be used in the "Value" field:

- User-Defined: Input a User-Defined value under the "Value" field.

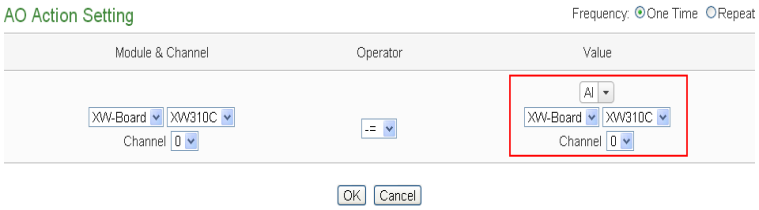


- Internal Register: Select the number of the Internal Register from the dropdown list.

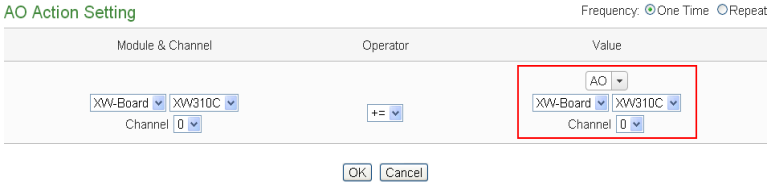


- AI: Using AI channel values from XW-Board/M-7000, select the module and channel from the dropdown list to

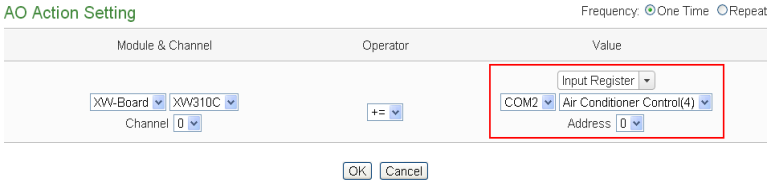
specify which channel value will be used.



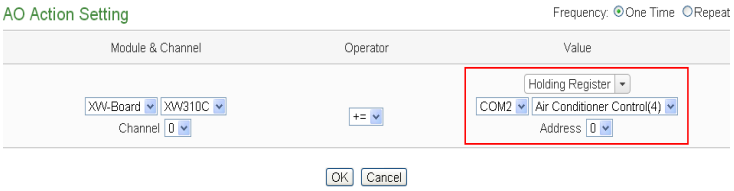
- AO: using AO channel values from XW-Board/M-7000, select the module and channel from the dropdown list to specify which channel value will be used.



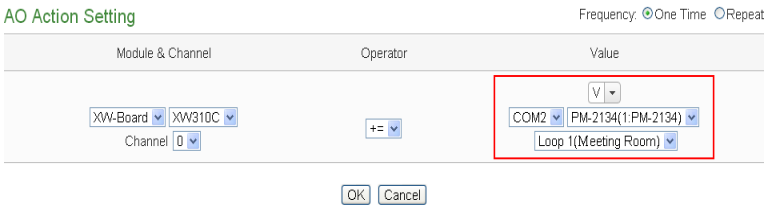
- Internal Register: using value of Internal Register from Modbus RTU/TCP Slave modules, select the module and address from the dropdown list to specify which channel value will be used.



- Holding Register: using value of Holding Register from Modbus RTU/TCP Slave modules, select the module and address from the dropdown list to specify which channel value will be used.



- Power Meter: using the power data of the Power Meter; select the power data from the dropdown list: V, I, kW, kvar, kVA, PF, kWh, kvarh, kVAh, Actual Demand, Forecast Demand, Hourly Maximum Demand, Daily Maximum Demand, Monthly Maximum Demand, Daily Total Electricity, Monthly Total Electricity and Yearly Total Electricity. And then select the power meter and loop(or phase) from the dropdown list to specify which power meter and loop(or phase) value will be used.



iv Specify the “Frequency” to be “One-Time” or “Repeat”.

v Click “OK” button to confirm the settings and return to the Rule settings page.

10.2.2 Modbus Module

Click on “Modbus Module”, 2 options will appear as the following: Coil Output and Holding Register.

10.2.2.1 Coil Output

You can execute an action to change the status of Coil Output of Modbus TCP/RTU module in the THEN/ELSE Action statement; the editing page for Coil Output Action is shown as follow:

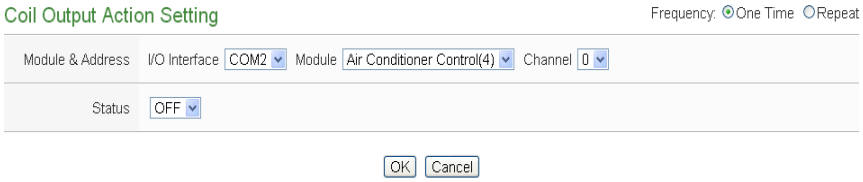


Figure10-21 : Coil Output action setting page

Follow the steps below:

i Select the module and address of the Coil Output from the dropdown list of the “Module & Address” section.

ii Specify the output value of Coil Output from the dropdown list of the “Status” field. The output value can be “OFF” or, “ON”.

iii Specify the “Frequency” to be “One-Time” or “Repeat”.

iv Click “OK” button to confirm the settings and return to the Rule settings page.

10.2.2.2 Holding Register

You can execute an action to change the value of Holding Register in the THEN/ELSE Action statement; the editing page for Holding Register Action is shown as follow:

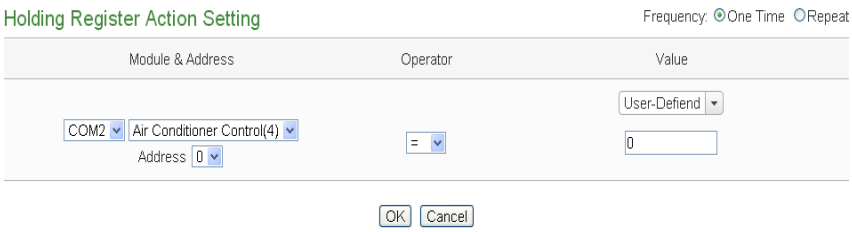


Figure10-22 : Holding Register action setting page

Follow the steps below:

i Select the module and address of the Holding Register from the dropdown list of the "Module & Address" section.

ii Specify the Operator in the "Operator" field. The 3 operators are as follow：

- "=" : Indicate assign the new Holding Register value as the value in "Value" field.
- "+=": Indicate assign the new Holding Register value as the original Holding Register value plus the value in "Value" field.
- "-=" : Indicate assign the new Holding Register value as the original Holding Register value minus the value in "Value" field.

iii Set up the value in the "Value" field, PMC-5151 provides 7 value options. Please refer to "10.2.1.3" section for more detailed information for value settings of these 7 options.

iv Specify the "Frequency" to be "One-Time" or "Repeat".

v Click "OK" button to confirm the settings and return to the Rule settings page.

10.2.3 Power Meter

Click on "Power Meter", 1 option "Power Relay" will appear. You can execute an action to change the Power Relay status of the Power Meter in the THEN/ELSE Action statement; the editing page for Power Relay Action of Power Meter is shown as follow:

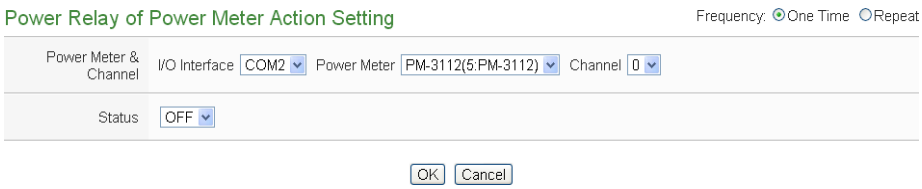


Figure10-23 : Power Meter Relay Action setting page

Follow the steps below:

i From the dropdown list of the “Power Meter & Channel” field, select the Power Meter module and Channel.

ii Specify the output value of Power Relay from the dropdown list of the “Status” field. The output value can be “OFF” or, “ON”.

iii Specify the “Frequency” to be “One-Time” or “Repeat”.
Click “OK” button to confirm the settings and return to the Rule settings page.

10.2.4 Timer

You can change the Timer status (to Start or to Reset the Timer) in the THEN/ELSE Action statement; the editing page for Timer Action Setting is shown as below:

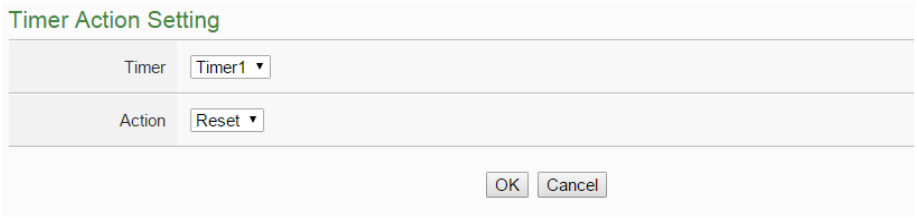


Figure10-24 : Timer action setting page

Follow the following steps:

i Select the pre-defined Timer from the dropdown list of the “Timer” field. Please note: the Timer you select has to be created in Advanced Setting.

ii Specify you want to “Reset” or “Start” this Timer when this THEN/ELSE Action statement is executed. The Start Action will start to run the Timer and if the Start Action is triggered one more time when the Timer is running, the Timer will restart again. The Reset action will reset the Timer and stop running the Timer.

iii Click “OK” button to save the settings. The popup window will be closed and return to the Rule settings page.

10.2.5 Email

You can send a Email message to an Email group when executing a THEN/ELSE Action statement; the editing page is as below:

Figure10-25 : Email action setting page

Follow the steps below:

i Select a pre-set Email group from the dropdown list of the "Index" field. Please note: the Email you select has to be enabled in Advanced Setting. The Email group information will be displayed for you to verify if this is the Email group you are going to send the message to.

ii Click "OK" button to confirm the settings and return to the Rule settings page.

10.2.6 SMS Alarm

You can send a specific SMS Alarm message (ICP DAS GTM-201-USB is required) when executing a THEN/ELSE Action statement.The setting page is show as below:

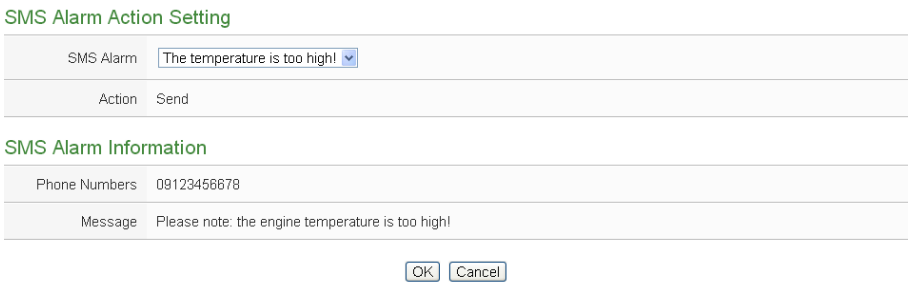


Figure10-26 : SMS Alarm action setting page

Follow the steps below:

ii In the "SMS Alarm" field, specify the SMS Alarm you want to execute in Action from the dropdown list. Please note: the SMS Alarm you select has to be enabled in Advanced Setting. The selected SMS Alarm message such as phone numbers and message content will be displayed for you to verify if this is the SMS Alarm

you want to send.

iii Click “OK” button to confirm the settings and return to the Rule settings page.

10.2.7 SNMP Trap

You can send a specific SNMP Trap when executing a THEN/ELSE Action statement.The setting page is show as below:

Figure10-27 : SNMP Trap Action Setting Page

Follow the steps below:

i In the “Trap” field, specify the SNMP Trap you want to execute in Action from the dropdown list. Please note, the SNMP Trap you select has to be the pre-set SNMP Trap in the SNMP Trap Setting of Advanced Setting. The selected SNMP Trap message such as “Variable Bindings” and message content will be displayed for you to verify if this is the SNMP Trap you want to send.

ii Select the Action Execution Frequency, there are two options as “One Time” and “Repeat” for selection. Please refer to “10.2 THEN/ELSE Action Setting” section for the description of “One Time” and “Repeat” operation.

iii Input the value in the “Waiting Time” field, it means after the action be exectued, how long the system will delay to execute the next Action. The unit will be second(s).

iv Click “OK” button to confirm the settings and return to the Rule settings page.

10.2.8 Data Logger

You can execute “One-Time Log” in the Action statements to perform data recording one-time only when an event is triggered. The setting page is show as below:

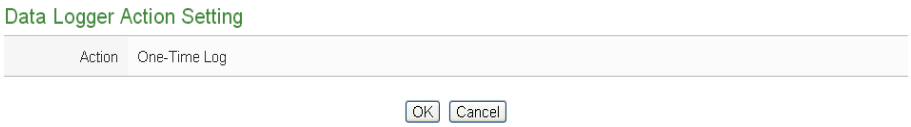


Figure10-28 : Data Logger action setting page

Follow the steps below:

i Click “OK” button to confirm the settings and return to the Rule settings page.

10.2.9 Rule Status

The Rule Status can be modified to be Disable or Enable in the Action. The editing page for Rule Status Action Setting is shown as below:

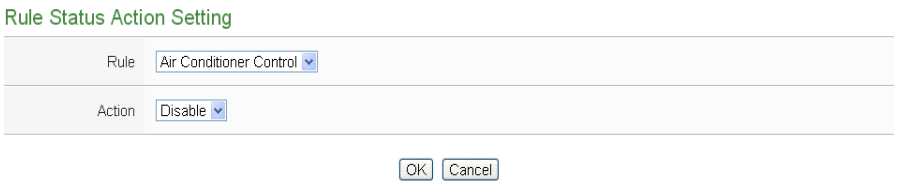


Figure10-29 : Rule Status action setting page

Follow the steps below:

i Specify the Rule (It has to be a previously saved Rule) that is going to be changed in the Action Condition statement from the dropdown list of the “Rule” field.

ii Specify the Rule status to be Disable or Enable from the dropdown list of the “Action” field. When the Action being executed, the Rule status will be changed to specified status.

iii Click “OK” button to confirm the settings and return to the Rule settings page.

10.2.10 Internal Register

You can modify the value of Internal Register in the THEN/ELSE Action statement; the editing page for Internal Register Action Setting is shown as below:

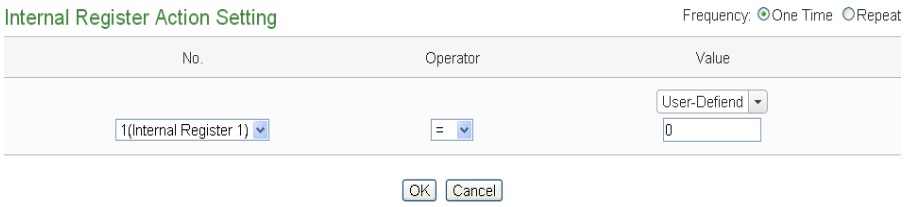


Figure10-30 : Internal Register action setting page

Follow the steps below:

i Select the pre-defined Internal Register from the dropdown list of the "No" field. Please note: the Internal Register you select has to be enabled in Advanced Setting.

ii Specify the Operator in the "Operator" field. The 5 operators are as follow:

- "=" : Indicate assign the new Internal Register value as the value in "Value" field.
- "+=" : Indicate assign the new Internal Register value as the original Internal Register value plus the value in "Value" field.
- "-=" : Indicate assign the new Internal Register value as the original Internal Register value minus the value in "Value" field.
- "*=" : Indicate assign the new Internal Register value as the original Internal Register value times the value in "Value" field.
- "/=" : Indicate assign the new Internal Register value as the original Internal Register value divided by the value in "Value" field.

iii Set up the value in the "Value" field, PMC-5151 provides 7 value options. Please refer to "10.2.1.3" section for more detailed information for value settings of these 7 options.

iv Specify the "Frequency" to be "One-Time" or "Repeat".

v Click "OK" button to confirm the settings and return to the Rule settings page.

Appendix I：Modbus Address Table

PMC-5151 allows SCADA software or HMI device to retrieve the power data, I/O channel data and system information via Modbus TCP/RTU protocol. PMC-5151 register addresses are specified according to Modbus register mapping tables (more detailed information will follow).

Please Note:

- The addresses are in **Base 0** format
- The addresses are in **Decimal** format
- The **default value of NetID is 1,** and you can modify the NetID value in the Network Setting page. (Please refer to 6.2 Network Setting).
- If the data is displayed in Floating format, each record of data will take two registers to hold the data. The following code example demonstrates how to join the two registers into one floating point value.

```
float register_to_float(short r1, short r2)
{
    float f;
    int *a = &f;
    *a = r1;
    a++;
    *a = r2;
    return f;
}
```

For the compilers are different (big endian or little endian) the floating point composing order might be different. For example: if r1 represent the address of 30100 register and r2 represent the address of 30101 register, to join r1 and r2 to a floating point, if the system is big endian system you will need to call:

float value = register_to_float(r1, r2);

On the other hand, if the system is little endian system, you will need to call:

float value = register_to_float(r2, r1);

Please Note:

1. If you are not sure your compiler belongs to which system, try both ways to find the accurate one.
2. The way to join the two registers value into DWORD is similar to Floating point; change the return value to DWORD or Unsigned Long.

PMC-5151 Modbus Address Table

<table>
<tr><th>Modbus Address</th><th>Coil Output (0x)</th><th>Discrete Input (1x)</th><th>Input Register (3x)</th><th>Holding Register (4x)</th></tr>
<tr><td>0~59</td><td colspan="4">PMC-5151 System Data(1)</td></tr>
<tr><td>60~75</td><td></td><td>COM2 module connection status(2)</td><td>COM2 module Information(3)</td><td rowspan="8">Internal Register Data(4)</td></tr>
<tr><td>76~91</td><td></td><td>COM3 module connection status(2)</td><td>COM3 module Information(3)</td></tr>
<tr><td>92~107</td><td></td><td>LAN(Modbus TCP) module connection status(2)</td><td>LAN(Modbus TCP) module Information(3)</td></tr>
<tr><td>108~123</td><td></td><td></td><td></td></tr>
<tr><td>124~139</td><td></td><td></td><td></td></tr>
<tr><td>140~155</td><td></td><td></td><td></td></tr>
<tr><td>200~299</td><td colspan="4">XW Board Data(5)</td></tr>
<tr><td>300~319</td><td colspan="4">PUE Data(6)</td></tr>
<tr><td rowspan="2">1000~20999</td><td colspan="4">Module / Power Meter Data of COM2</td></tr>
<tr><td colspan="4">(1) Each Module/Power Data block contains 1200 addresses.
(2) Each Power Meter Information block contains 50 addresses.</td></tr>
<tr><td rowspan="12"></td><td>1000~2199</td><td colspan="3">Module/Power Data (Index=1) of COM2(7)</td></tr>
<tr><td>2200~3399</td><td colspan="3">Module/Power Data (Index=2) of COM2(7)</td></tr>
<tr><td>3400~4599</td><td colspan="3">Module/Power Data (Index=3) of COM2(7)</td></tr>
<tr><td>4600~5799</td><td colspan="3">Module/Power Data (Index=4) of COM2(7)</td></tr>
<tr><td>5800~6999</td><td colspan="3">Module/Power Data (Index=5) of COM2(7)</td></tr>
<tr><td>7000~8199</td><td colspan="3">Module/Power Data (Index=6) of COM2(7)</td></tr>
<tr><td>8200~9399</td><td colspan="3">Module/Power Data (Index=7) of COM2(7)</td></tr>
<tr><td>9400~10599</td><td colspan="3">Module/Power Data (Index=8) of COM2(7)</td></tr>
<tr><td>10600~11799</td><td colspan="3">Module/Power Data (Index=9) of COM2(7)</td></tr>
<tr><td>11800~12999</td><td colspan="3">Module/Power Data (Index=10) of COM2(7)</td></tr>
<tr><td>13000~14199</td><td colspan="3">Module/Power Data (Index=11) of COM2(7)</td></tr>
</table>

	14200~15399	Module/Power Data (Index=12) of COM2(7)
	15400~16599	Module/Power Data (Index=13) of COM2(7)
	16600~17799	Module/Power Data (Index=14) of COM2(7)
	17800~18999	Module/Power Data (Index=15) of COM2(7)
	19000~20199	Module/Power Data (Index=16) of COM2(7)
	20200~20249	Power Meter Information (Index=1) of COM2(7)
	20250~20299	Power Meter Information (Index=2) of COM2(7)
	20300~20349	Power Meter Information (Index=3) of COM2(7)
	20350~20399	Power Meter Information (Index=4) of COM2(7)
	20400~20449	Power Meter Information (Index=5) of COM2(7)
	20450~20499	Power Meter Information (Index=6) of COM2(7)
	20500~20549	Power Meter Information (Index=7) of COM2(7)
	20550~20599	Power Meter Information (Index=8) of COM2(7)
	20600~20649	Power Meter Information (Index=9) of COM2(7)
	20650~20699	Power Meter Information (Index=10) of COM2(7)
	20700~20749	Power Meter Information (Index=11) of COM2(7)
	20750~20799	Power Meter Information (Index=12) of COM2(7)
	20800~20849	Power Meter Information (Index=13) of COM2(7)
	20850~20899	Power Meter Information (Index=14) of COM2(7)
	20900~20949	Power Meter Information (Index=15) of COM2(7)
	20950~20999	Power Meter Information (Index=16) of COM2(7)
21000~40999	Module / Power Meter Data of COM3 (1) Each Module/Power Data block contains 1200 addresses. (2) Each Power Meter Information block contains 50 addresses.	
	21000~22199	Module/Power Data (Index=1) of COM3(7)
	22200~23399	Module/Power Data (Index=2) of COM3(7)
	23400~24599	Module/Power Data (Index=3) of COM3(7)
	24600~25799	Module/Power Data (Index=4) of COM3(7)
	25800~26999	Module/Power Data (Index=5) of COM3(7)
	27000~28199	Module/Power Data (Index=6) of COM3(7)
	28200~29399	Module/Power Data (Index=7) of COM3(7)
	29400~30599	Module/Power Data (Index=8) of COM3(7)
	30600~31799	Module/Power Data (Index=9) of COM3(7)
	31800~32999	Module/Power Data (Index=10) of COM3(7)
	33000~34199	Module/Power Data (Index=11) of COM3(7)

	34200~35399	Module/Power Data $_{(Index=12)}$ of COM3$_{(7)}$
	35400~36599	Module/Power Data $_{(Index=13)}$ of COM3$_{(7)}$
	36600~37799	Module/Power Data $_{(Index=14)}$ of COM3$_{(7)}$
	37800~38999	Module/Power Data $_{(Index=15)}$ of COM3$_{(7)}$
	39000~40199	Module/Power Data $_{(Index=16)}$ of COM3$_{(7)}$
	40200~40249	Power Meter Information $_{(Index=1)}$ of COM3$_{(7)}$
	40250~40299	Power Meter Information $_{(Index=2)}$ of COM3$_{(7)}$
	40300~40349	Power Meter Information $_{(Index=3)}$ of COM3$_{(7)}$
	40350~40399	Power Meter Information $_{(Index=4)}$ of COM3$_{(7)}$
	40400~40449	Power Meter Information $_{(Index=5)}$ of COM3$_{(7)}$
	40450~40499	Power Meter Information $_{(Index=6)}$ of COM3$_{(7)}$
	40500~40549	Power Meter Information $_{(Index=7)}$ of COM3$_{(7)}$
	40550~40599	Power Meter Information $_{(Index=8)}$ of COM3$_{(7)}$
	40600~40649	Power Meter Information $_{(Index=9)}$ of COM3$_{(7)}$
	40650~40699	Power Meter Information $_{(Index=10)}$ of COM3$_{(7)}$
	40700~40749	Power Meter Information $_{(Index=11)}$ of COM3$_{(7)}$
	40750~40799	Power Meter Information $_{(Index=12)}$ of COM3$_{(7)}$
	40800~40849	Power Meter Information $_{(Index=13)}$ of COM3$_{(7)}$
	40850~40899	Power Meter Information $_{(Index=14)}$ of COM3$_{(7)}$
	40900~40949	Power Meter Information $_{(Index=15)}$ of COM3$_{(7)}$
	40950~40999	Power Meter Information $_{(Index=16)}$ of COM3$_{(7)}$
41000~60999	Module / Power Meter Data of LAN (1) Each Module/Power Data block contains 1200 addresses. (2) Each Power Meter Information block contains 50 addresses.	
	41000~42199	Module/Power Data $_{(Index=1)}$ of LAN$_{(7)}$
	42200~43399	Module/Power Data $_{(Index=2)}$ of LAN$_{(7)}$
	43400~44599	Module/Power Data $_{(Index=3)}$ of LAN$_{(7)}$
	44600~45799	Module/Power Data $_{(Index=4)}$ of LAN$_{(7)}$
	45800~46999	Module/Power Data $_{(Index=5)}$ of LAN$_{(7)}$
	47000~48199	Module/Power Data $_{(Index=6)}$ of LAN$_{(7)}$
	48200~49399	Module/Power Data $_{(Index=7)}$ of LAN$_{(7)}$
	49400~50599	Module/Power Data $_{(Index=8)}$ of LAN$_{(7)}$
	50600~51799	Module/Power Data $_{(Index=9)}$ of LAN$_{(7)}$
	51800~52999	Module/Power Data $_{(Index=10)}$ of LAN$_{(7)}$
	53000~54199	Module/Power Data $_{(Index=11)}$ of LAN$_{(7)}$

	54200~55399	Module/Power Data $_{(Index=12)}$ of LAN$_{(7)}$
	55400~56599	Module/Power Data $_{(Index=13)}$ of LAN$_{(7)}$
	56600~57799	Module/Power Data $_{(Index=14)}$ of LAN$_{(7)}$
	57800~58999	Module/Power Data $_{(Index=15)}$ of LAN$_{(7)}$
	59000~60199	Module/Power Data $_{(Index=16)}$ of LAN$_{(7)}$
	60200~60249	Power Meter Information $_{(Index=1)}$ of LAN$_{(7)}$
	60250~60299	Power Meter Information $_{(Index=2)}$ of LAN$_{(7)}$
	60300~60349	Power Meter Information $_{(Index=3)}$ of LAN$_{(7)}$
	60350~60399	Power Meter Information $_{(Index=4)}$ of LAN$_{(7)}$
	60400~60449	Power Meter Information $_{(Index=5)}$ of LAN$_{(7)}$
	60450~60499	Power Meter Information $_{(Index=6)}$ of LAN$_{(7)}$
	60500~60549	Power Meter Information $_{(Index=7)}$ of LAN$_{(7)}$
	60550~60599	Power Meter Information $_{(Index=8)}$ of LAN$_{(7)}$
	60600~60649	Power Meter Information $_{(Index=9)}$ of LAN$_{(7)}$
	60650~60699	Power Meter Information $_{(Index=10)}$ of LAN$_{(7)}$
	60700~60749	Power Meter Information $_{(Index=11)}$ of LAN$_{(7)}$
	60750~60799	Power Meter Information $_{(Index=12)}$ of LAN$_{(7)}$
	60800~60849	Power Meter Information $_{(Index=13)}$ of LAN$_{(7)}$
	60850~60899	Power Meter Information $_{(Index=14)}$ of LAN$_{(7)}$
	60900~60949	Power Meter Information $_{(Index=15)}$ of LAN$_{(7)}$
	60950~60999	Power Meter Information $_{(Index=16)}$ of LAN$_{(7)}$

More detailed information for each block please refer to the number in quotes and find the related information in the following section.

(1) PMC-5151 System Data

This block stores the system information of PMC-5151, shown as below:

Parameter Name	Modbus Address	Length	Data Type	Range
[1x] Discrete Input, Unit : Coil(8 Bits)				
Local FTP Server	100000	1	Byte	0=Disable 1=Enable
[3x] Input Register, Unit : Register(16 Bits)				
Module Name	300000	1	UInt16	0~65535
Firmware Version	300002	2	Float	Floating Point
Serial Number 1	300004	1	UInt16	0~65535
Serial Number 2	300005	1	UInt16	0~65535
Serial Number 3	300006	1	UInt16	0~65535
Serial Number 4	300007	1	UInt16	0~65535
Serial Number 5	300008	1	UInt16	0~65535
Serial Number 6	300009	1	UInt16	0~65535
Serial Number 7	300010	1	UInt16	0~65535
Serial Number 8	300011	1	UInt16	0~65535
Boot Date(Year)	300012	1	UInt16	1752~
Boot Date(Month)	300013	1	UInt16	1~12
Boot Date(Day)	300014	1	UInt16	1~31
Boot Time(Hour)	300015	1	UInt16	0~23
Boot Time(Minute)	300016	1	UInt16	0~59
Boot Time(Second)	300017	1	UInt16	0~59
Alive Count	300018	1	UInt16	0~65535
Cycle Time	300019	1	UInt16	0~65535(ms)
XW-Board Name	300020	1	UInt16	0~65535
COM2 Connection Status	300021	1	UInt16	0=Offline, 1=Online Each bit represents a module.
COM3 Connection Status	300022	1	UInt16	
LAN Connection Status	300023	1	UInt16	
XW-Board Update Rate	300024	1	UInt16	0~65535(ms)
COM2 Update Rate	300025	1	UInt16	0~65535(ms)
COM3 Update Rate	300026	1	UInt16	0~65535(ms)
Modbus Slave NetID	300028	1	UInt16	1~247
Modbus TCP Port	300029	1	UInt16	1~65535
Web Port	300030	1	UInt16	1~65535

SMS Modem Status	300031	1	UInt16	0=Initial success Others=Initializing
SMS Register Status	300032	1	UInt16	0=Not registered 1=Registered, home network 2=Not registered, and searching 3=Registration denied 4=Unknown 5=Registered, roaming
SMS Signal	300033	1	UInt16	0~65535
micro SD Free Space	300034	1	UInt16	0~65535(MB)
FTP Upload Status	300035	1	Int16	-1=Initializing 0=Failed 1=Success
Contract Capacity	300036	2	Float	0~99999999(kW)
Carbon Footprint Factor	300038	2	Float	0.001~99999999
Calculation Interval for Demand	300040	1	UInt16	15/30/60(minutes)

(2) COM2 / COM3 / LAN Modules Connection Status

This block stores the connection status of M-7000, power meter and Modbus TCP/RTU modules that are connected to the PMC-5151, detailed information is shown as below:

Parameter Name	Modbus Address	Length	Data Type	Range
[1x] Discrete Input, Unit : Coil (8 Bits)				
The connection status of M-7000, power meter and Modbus RTU modules that are connected to COM2.	100060-100075	1	Byte	0=Offline 1=Online
The connection status of M-7000, power meter and Modbus RTU modules that are connected to COM3.	100076-100091	1	Byte	0=Offline 1=Online

The connection status of power meter and Modbus TCP modules that are connected to LAN.	100092-100107	1	Byte	0=Offline 1=Online

(3) COM2 / COM3 / LAN Modules Information

This block stores the module type or address information of M-7000, power meter and Modbus TCP/RTU modules that are connected to the PMC-5151. If the module is M-7000 or power meter, it will show the module type. If it is the Modbus TCP/RTU module, it will show the Address or NetID of the module. Detailed information is shown as below:

Parameter Name	Modbus Address	Length	Data Type	Range
[3x] Input Register, Unit : Register(16 Bits)				
The module type or address of M-7000, power meter or Modbus RTU modules that are connected to COM2.	300060-300075	1	UInt16	7002 ~ 7088 / 2133 ~ 4324 / Module Address(1~64)
The module type or address of M-7000, power meter or Modbus RTU modules that are connected to COM3.	300076-300091	1	UInt16	7002 ~ 7088 / 2133 ~ 4324 / ModuleAddress(1~64)
The module type or NetID of power meter or Modbus TCP modules that are connected to LAN.	300092-300107	1	UInt16	2133 ~ 4324 / Module NetID(1~247)

(4) Internal Register Data

This block stores 48 sets of Internal Register data provided by PMC-5151.

Parameter Name	Modbus Address	Length	Data Type	Range
[4x] Holding Register, Unit : Register(16 Bits)				
Internal Register 1	400060	2	Float	Floating Point
Internal Register 2	400062	2	Float	Floating Point
Internal Register 3	400064	2	Float	Floating Point
Internal Register 4	400066	2	Float	Floating Point
Internal Register 5	400068	2	Float	Floating Point
Internal Register 6	400070	2	Float	Floating Point

Internal Register 7	400072	2	Float	Floating Point
Internal Register 8	400074	2	Float	Floating Point
⋮				
Internal Register 45	400148	2	Float	Floating Point
Internal Register 46	400150	2	Float	Floating Point
Internal Register 47	400152	2	Float	Floating Point
Internal Register 48	400154	2	Float	Floating Point

(5) XW Board Data

This block stores information of XW-Board. For different XW-Board modules, the data will be store in different address, the following section shows corresponding address information for different modules.

- **XW107、XW107i**

Parameter Name	Modbus Address	Length	Data Type	Range
[0x] Coil Output, Unit : Coil(8 Bits)				
DO Ch.0	000200	1	Byte	0=OFF, 1=ON
DO Ch.1	000201	1	Byte	0=OFF, 1=ON
DO Ch.2	000202	1	Byte	0=OFF, 1=ON
DO Ch.3	000203	1	Byte	0=OFF, 1=ON
DO Ch.4	000204	1	Byte	0=OFF, 1=ON
DO Ch.5	000205	1	Byte	0=OFF, 1=ON
DO Ch.6	000206	1	Byte	0=OFF, 1=ON
DO Ch.7	000207	1	Byte	0=OFF, 1=ON
[1x] Discrete Input, Unit : Coil (8 Bits)				
DI Ch.0	100200	1	Byte	0=OFF, 1=ON
DI Ch.1	100201	1	Byte	0=OFF, 1=ON
DI Ch.2	100202	1	Byte	0=OFF, 1=ON
DI Ch.3	100203	1	Byte	0=OFF, 1=ON
DI Ch.4	100204	1	Byte	0=OFF, 1=ON
DI Ch.5	100205	1	Byte	0=OFF, 1=ON
DI Ch.6	100206	1	Byte	0=OFF, 1=ON
DI Ch.7	100207	1	Byte	0=OFF, 1=ON
[3x] Input Register, Unit : Register(16 Bits)				
DI Counter 0	300200	1	UInt16	0~65535

DI Counter 1	300201	1	UInt16	0~65535
DI Counter 2	300202	1	UInt16	0~65535
DI Counter 3	300203	1	UInt16	0~65535
DI Counter 4	300204	1	UInt16	0~65535
DI Counter 5	300205	1	UInt16	0~65535
DI Counter 6	300206	1	UInt16	0~65535
DI Counter 7	300207	1	UInt16	0~65535

- **XW110i**

Parameter Name	Modbus Address	Length	Data Type	Range
[1x] Discrete Input, Unit : Coil (8 Bits)				
DI Ch.0	100200	1	Byte	0=OFF, 1=ON
DI Ch.1	100201	1	Byte	0=OFF, 1=ON
DI Ch.2	100202	1	Byte	0=OFF, 1=ON
DI Ch.3	100203	1	Byte	0=OFF, 1=ON
DI Ch.4	100204	1	Byte	0=OFF, 1=ON
DI Ch.5	100205	1	Byte	0=OFF, 1=ON
DI Ch.6	100206	1	Byte	0=OFF, 1=ON
DI Ch.7	100207	1	Byte	0=OFF, 1=ON
DI Ch.8	100208	1	Byte	0=OFF, 1=ON
DI Ch.9	100209	1	Byte	0=OFF, 1=ON
DI Ch.10	100210	1	Byte	0=OFF, 1=ON
DI Ch.11	100211	1	Byte	0=OFF, 1=ON
DI Ch.12	100212	1	Byte	0=OFF, 1=ON
DI Ch.13	100213	1	Byte	0=OFF, 1=ON
DI Ch.14	100214	1	Byte	0=OFF, 1=ON
DI Ch.15	100215	1	Byte	0=OFF, 1=ON
[3x] Input Register, Unit : Register(16 Bits)				
DI Counter 0	300200	1	UInt16	0~65535
DI Counter 1	300201	1	UInt16	0~65535
DI Counter 2	300202	1	UInt16	0~65535
DI Counter 3	300203	1	UInt16	0~65535
DI Counter 4	300204	1	UInt16	0~65535
DI Counter 5	300205	1	UInt16	0~65535
DI Counter 6	300206	1	UInt16	0~65535
DI Counter 7	300207	1	UInt16	0~65535

DI Counter 8	300208	1	UInt16	0~65535
DI Counter 9	300209	1	UInt16	0~65535
DI Counter 10	300210	1	UInt16	0~65535
DI Counter 11	300211	1	UInt16	0~65535
DI Counter 12	300212	1	UInt16	0~65535
DI Counter 13	300213	1	UInt16	0~65535
DI Counter 14	300214	1	UInt16	0~65535
DI Counter 15	300215	1	UInt16	0~65535

- **XW304**

Parameter Name	Modbus Address	Length	Data Type	Range
[0x] Coil Output, Unit : Coil(8 Bits)				
DO Ch.0	000200	1	Byte	0=OFF, 1=ON
DO Ch.1	000201	1	Byte	0=OFF, 1=ON
DO Ch.2	000202	1	Byte	0=OFF, 1=ON
DO Ch.3	000203	1	Byte	0=OFF, 1=ON
[1x] Discrete Input, Unit : Coil (8 Bits)				
DI Ch.0	100200	1	Byte	0=OFF, 1=ON
DI Ch.1	100201	1	Byte	0=OFF, 1=ON
DI Ch.2	100202	1	Byte	0=OFF, 1=ON
DI Ch.3	100203	1	Byte	0=OFF, 1=ON
[3x] Input Register, Unit : Register(16 Bits)				
AI Ch.0	300200	2	Float	Floating Point
AI Ch.1	300202	2	Float	Floating Point
AI Ch.2	300204	2	Float	Floating Point
AI Ch.3	300206	2	Float	Floating Point
AI Ch.4	300208	2	Float	Floating Point
AI Ch.5	300210	2	Float	Floating Point
DI Counter 0	300212	1	UInt16	0~65535
DI Counter 1	300213	1	UInt16	0~65535
DI Counter 2	300214	1	UInt16	0~65535
DI Counter 3	300215	1	UInt16	0~65535
[4x] Holding Register, Unit : Register(16 Bits)				
AO Ch.0	400200	2	Float	Floating Point

- **XW310、XW310C(Differential)**

Parameter Name	Modbus Address	Length	Data Type	Range
[0x] Coil Output, Unit : Coil(8 Bits)				
DO Ch.0	000200	1	Byte	0=OFF, 1=ON
DO Ch.1	000201	1	Byte	0=OFF, 1=ON
DO Ch.2	000202	1	Byte	0=OFF, 1=ON
[1x] Discrete Input, Unit : Coil (8 Bits)				
DI Ch.0	100200	1	Byte	0=OFF, 1=ON
DI Ch.1	100201	1	Byte	0=OFF, 1=ON
DI Ch.2	100202	1	Byte	0=OFF, 1=ON
[3x] Input Register, Unit : Register(16 Bits)				
AI Ch.0	300200	2	Float	Floating Point
AI Ch.1	300202	2	Float	Floating Point
AI Ch.2	300204	2	Float	Floating Point
AI Ch.3	300206	2	Float	Floating Point
DI Counter 0	300208	1	UInt16	0~65535
DI Counter 1	300209	1	UInt16	0~65535
DI Counter 2	300210	1	UInt16	0~65535
[4x] Holding Register, Unit : Register(16 Bits)				
AO Ch.0	400200	2	Float	Floating Point
AO Ch.1	400202	2	Float	Floating Point

- **XW310C(Single-Ended)**

Parameter Name	Modbus Address	Length	Data Type	Range
[0x] Coil Output, Unit : Coil(8 Bits)				
DO Ch.0	000200	1	Byte	0=OFF, 1=ON
DO Ch.1	000201	1	Byte	0=OFF, 1=ON
DO Ch.2	000202	1	Byte	0=OFF, 1=ON
[1x] Discrete Input, Unit : Coil (8 Bits)				
DI Ch.0	100200	1	Byte	0=OFF, 1=ON
DI Ch.1	100201	1	Byte	0=OFF, 1=ON
DI Ch.2	100202	1	Byte	0=OFF, 1=ON
[3x] Input Register, Unit : Register(16 Bits)				
AI Ch.0	300200	2	Float	Floating Point
AI Ch.1	300202	2	Float	Floating Point

AI Ch.2	300204	2	Float	Floating Point
AI Ch.3	300206	2	Float	Floating Point
AI Ch.4	300208	2	Float	Floating Point
AI Ch.5	300210	2	Float	Floating Point
AI Ch.6	300212	2	Float	Floating Point
AI Ch.7	300214	2	Float	Floating Point
DI Counter 0	300216	1	UInt16	0~65535
DI Counter 1	300217	1	UInt16	0~65535
DI Counter 2	300218	1	UInt16	0~65535
[4x] Holding Register, Unit : Register(16 Bits)				
AO Ch.0	400200	2	Float	Floating Point
AO Ch.1	400202	2	Float	Floating Point

(6) PUE Data

This block stores information of 10 user-defined PUEs.

Parameter Name	Modbus Address	Length	Data Type	Range
[3x] Input Register, Unit : Register(16 Bits)				
PUE 1	300300	2	Float	Floating Point
PUE 2	300302	2	Float	Floating Point
PUE 3	300304	2	Float	Floating Point
PUE 4	300306	2	Float	Floating Point
PUE 5	300308	2	Float	Floating Point
PUE 6	300310	2	Float	Floating Point
PUE 7	300312	2	Float	Floating Point
PUE 8	300314	2	Float	Floating Point
PUE 9	300316	2	Float	Floating Point
PUE 10	300318	2	Float	Floating Point

(7) Module Data

This block stores all I/O channel data of M-7000 modules, power data of power meters and I/O channel data of Modbus TCP/RTU modules. Depend on different configuration of I/O modules and power meters, the arrangement of data block will be different. Detailed information is shown as below：

1. Make sure which connection port (COM2, COM3 or LAN), and which index number the module is.

Connection port	Starting Modbus address of Module/Power data(1)	Starting Modbus address of Power Meter Information(2)
COM2	1000	20200
COM3	21000	40200
LAN	41000	60200

2. [Module/Power Data]Calculate the value of SA (The starting Modbus address of the data block of the module) based on the type of the connection port and the index number.
   SA = The starting Modbus address of Module/Power data(1) of the connection port + (Module/Power Meter Index number - 1) x 1200
3. [Power Meter Information] Calculate the value of PM_SA (The starting Modbus address of basic information block of the power meter) based on the type of the connection port and the index number.
   PM_SA = The starting Modbus address of Power Meter Information(2) of the connection port + (Power Meter Index number - 1) x 50
4. Check the Modbus Address Table of each type module (shown as below), to calculate the real I/O channel Modbus Address or real Loop (or Phase) power data Modbus Address with SA value for the M-7000, power meter and Modbus TCP/RTU module that are connected to PMC-5151.
5. Check the Modbus Address Table of each type power meter (shown as below), to calculate the real power meter attributes Modbus Address with PM_SA value for the power meter that are connected to PMC-5151.

For example: Assume there is an M-7024 module connected to the COM3 of PMC-5151. Its module index number is 3. So the SA value of the M-7024 is 21000 + (3 – 1) x 200) = 23400. The Modbus Address of the AO channel 2 of the module is 23400 + 04 = 23404. The M-7000 module Modbus Address Table is shown as below:

- **M-7002 (5 DI、4 DO、4 AI channel)**

Parameter Name	Modbus Address	Length	Data Type	Range
[0x] Coil Output, Unit : Coil(8 Bits)				
DO Ch.0	SA + 000000	1	Byte	0=OFF, 1=ON
DO Ch.1	SA + 000001	1	Byte	0=OFF, 1=ON
DO Ch.2	SA + 000002	1	Byte	0=OFF, 1=ON
DO Ch.3	SA + 000003	1	Byte	0=OFF, 1=ON
DO Ch.4	SA + 000000	1	Byte	0=OFF, 1=ON
[1x] Discrete Input, Unit : Coil (8 Bits)				
DI Ch.0	SA + 100000	1	Byte	0=OFF, 1=ON
DI Ch.1	SA + 100001	1	Byte	0=OFF, 1=ON
DI Ch.2	SA + 100002	1	Byte	0=OFF, 1=ON
DI Ch.3	SA + 100003	1	Byte	0=OFF, 1=ON
DI Ch.4	SA + 100004	1	Byte	0=OFF, 1=ON
[3x] Input Register, Unit : Register(16 Bits)				
AI Ch.0	SA + 300000	2	Float	Floating Point
AI Ch.1	SA + 300002	2	Float	Floating Point
AI Ch.2	SA + 300004	2	Float	Floating Point
AI Ch.3	SA + 300006	2	Float	Floating Point
DI Counter 0	SA + 300008	1	UInt16	0~65535
DI Counter 1	SA + 300009	1	UInt16	0~65535
DI Counter 2	SA + 300010	1	UInt16	0~65535
DI Counter 3	SA + 300011	1	UInt16	0~65535
DI Counter 4	SA + 300012	1	UInt16	0~65535

- **M-7005 (6 DO、8 AI channel)**

Parameter Name	Modbus Address	Length	Data Type	Range
[0x] Coils Output, Unit : Coil(8 Bits)				
DO Ch.0	SA + 000000	1	Byte	0=OFF, 1=ON
DO Ch.1	SA + 000001	1	Byte	0=OFF, 1=ON
DO Ch.2	SA + 000002	1	Byte	0=OFF, 1=ON
DO Ch.3	SA + 000003	1	Byte	0=OFF, 1=ON
DO Ch.4	SA + 000004	1	Byte	0=OFF, 1=ON

DO Ch.5	SA + 000005	1	Byte	0=OFF, 1=ON
[3x] Input Register, Unit : Register(16 Bits)				
AI Ch.0	SA + 300000	2	Float	Floating Point
AI Ch.1	SA + 300002	2	Float	Floating Point
AI Ch.2	SA + 300004	2	Float	Floating Point
AI Ch.3	SA + 300006	2	Float	Floating Point
AI Ch.4	SA + 300008	2	Float	Floating Point
AI Ch.5	SA + 300010	2	Float	Floating Point
AI Ch.6	SA + 300012	2	Float	Floating Point
AI Ch.7	SA + 300014	2	Float	Floating Point

- **M-7011 (1 DI、2 DO、1 AI channel)**

Parameter Name	Modbus Address	Length	Data Type	Range
[0x] Coils Output, Unit : Coil(8 Bits)				
DO Ch.0	SA + 000000	1	Byte	0=OFF, 1=ON
DO Ch.1	SA + 000001	1	Byte	0=OFF, 1=ON
[1x] Discrete Input, Unit : Coil (8 Bits)				
DI Ch.0	SA + 100000	1	Byte	0=OFF, 1=ON
[3x] Input Register, Unit : Register(16 Bits)				
AI Ch.0	SA + 300000	2	Float	Floating Point
DI Counter 0	SA + 300002	1	UInt16	0~65535

- **M-7015、M-7015P (6 AI channel)**

Parameter Name	Modbus Address	Length	Data Type	Range
[3x] Input Register, Unit : Register(16 Bits)				
AI Ch.0	SA + 300000	2	Float	Floating Point
AI Ch.1	SA + 300002	2	Float	Floating Point
AI Ch.2	SA + 300004	2	Float	Floating Point
AI Ch.3	SA + 300006	2	Float	Floating Point
AI Ch.4	SA + 300008	2	Float	Floating Point
AI Ch.5	SA + 300010	2	Float	Floating Point

- **M-7016 (1 DI、4 DO、2 AI、1 AO channel)**

Parameter Name	Modbus Address	Length	Data Type	Range
[0x] Coils Output, Unit : Coil(8 Bits)				
DO Ch.0	SA + 000000	1	Byte	0=OFF, 1=ON
DO Ch.1	SA + 000001	1	Byte	0=OFF, 1=ON
DO Ch.2	SA + 000002	1	Byte	0=OFF, 1=ON
DO Ch.3	SA + 000003	1	Byte	0=OFF, 1=ON
[1x] Discrete Input, Unit : Coil (8 Bits)				
DI Ch.0	SA + 100000	1	Byte	0=OFF, 1=ON
[3x] Input Register, Unit : Register(16 Bits)				
AI Ch.0	SA + 300000	2	Float	Floating Point
AI Ch.1	SA + 300002	2	Float	Floating Point
DI Counter 0	SA + 300004	1	UInt16	0~65535
[4x] Holding Register, Unit : Register(16 Bits)				
AO Ch.0	SA + 400000	2	Float	Floating Point

- **M-7017、M-7017R、M-7017C、M-7017RC、M-7017R-A5、M-7018、M-7018R、M-7019R (8 AI channel)**

Parameter Name	Modbus Address	Length	Data Type	Range
[3x] Input Register, Unit : Register(16 Bits)				
AI Ch.0	SA + 300000	2	Float	Floating Point
AI Ch.1	SA + 300002	2	Float	Floating Point
AI Ch.2	SA + 300004	2	Float	Floating Point
AI Ch.3	SA + 300006	2	Float	Floating Point
AI Ch.4	SA + 300008	2	Float	Floating Point
AI Ch.5	SA + 300010	2	Float	Floating Point
AI Ch.6	SA + 300012	2	Float	Floating Point
AI Ch.7	SA + 300014	2	Float	Floating Point

- **M-7017Z (10 Differential AI channel)**

Parameter Name	Modbus Address	Length	Data Type	Range
[3x] Input Register, Unit : Register(16 Bits)				
AI Ch.0	SA + 300000	2	Float	Floating Point
AI Ch.1	SA + 300002	2	Float	Floating Point
AI Ch.2	SA + 300004	2	Float	Floating Point
AI Ch.3	SA + 300006	2	Float	Floating Point
AI Ch.4	SA + 300008	2	Float	Floating Point
AI Ch.5	SA + 300010	2	Float	Floating Point
AI Ch.6	SA + 300012	2	Float	Floating Point
AI Ch.7	SA + 300014	2	Float	Floating Point
AI Ch.8	SA + 300016	2	Float	Floating Point
AI Ch.9	SA + 300018	2	Float	Floating Point

- **M-7017Z (20 Single-Ended AI channel)**

Parameter Name	Modbus Address	Length	Data Type	Range
[3x] Input Register, Unit : Register(16 Bits)				
AI Ch.0	SA + 300000	2	Float	Floating Point
AI Ch.1	SA + 300002	2	Float	Floating Point
AI Ch.2	SA + 300004	2	Float	Floating Point
AI Ch.3	SA + 300006	2	Float	Floating Point
AI Ch.4	SA + 300008	2	Float	Floating Point
AI Ch.5	SA + 300010	2	Float	Floating Point
AI Ch.6	SA + 300012	2	Float	Floating Point
AI Ch.7	SA + 300014	2	Float	Floating Point
AI Ch.8	SA + 300016	2	Float	Floating Point
AI Ch.9	SA + 300018	2	Float	Floating Point
AI Ch.10	SA + 300020	2	Float	Floating Point
AI Ch.11	SA + 300022	2	Float	Floating Point
AI Ch.12	SA + 300024	2	Float	Floating Point
AI Ch.13	SA + 300026	2	Float	Floating Point
AI Ch.14	SA + 300028	2	Float	Floating Point
AI Ch.15	SA + 300030	2	Float	Floating Point
AI Ch.16	SA + 300032	2	Float	Floating Point

AI Ch.17	SA + 300034	2	Float	Floating Point
AI Ch.18	SA + 300036	2	Float	Floating Point
AI Ch.19	SA + 300038	2	Float	Floating Point

- **M-7018Z、M-7019Z (10 AI channel)**

Parameter Name	Modbus Address	Length	Data Type	Range
[3x] Input Register, Unit : Register(16 Bits)				
AI Ch.0	SA + 300000	2	Float	Floating Point
AI Ch.1	SA + 300002	2	Float	Floating Point
AI Ch.2	SA + 300004	2	Float	Floating Point
AI Ch.3	SA + 300006	2	Float	Floating Point
AI Ch.4	SA + 300008	2	Float	Floating Point
AI Ch.5	SA + 300010	2	Float	Floating Point
AI Ch.6	SA + 300012	2	Float	Floating Point
AI Ch.7	SA + 300014	2	Float	Floating Point
AI Ch.8	SA + 300016	2	Float	Floating Point
AI Ch.9	SA + 300018	2	Float	Floating Point

- **M-7022 (2 AO channel)**

Parameter Name	Modbus Address	Length	Data Type	Range
[4x] Holding Register, Unit : Register(16 Bits)				
AO Ch.0	SA + 400000	2	Float	Floating Point
AO Ch.1	SA + 400002	2	Float	Floating Point

- **M-7024 (4 AO channel)**

Parameter Name	Modbus Address	Length	Data Type	Range
[4x] Holding Register, Unit : Register(16 Bits)				
AO Ch.0	SA + 400000	2	Float	Floating Point
AO Ch.1	SA + 400002	2	Float	Floating Point
AO Ch.2	SA + 400004	2	Float	Floating Point
AO Ch.3	SA + 400006	2	Float	Floating Point

- **M-7024R (5 DI、4 AO channel)**

Parameter Name	Modbus Address	Length	Data Type	Range
[1x] Discrete Input, Unit : Coil (8 Bits)				
DI Ch.0	SA + 100000	1	Byte	0=OFF, 1=ON
DI Ch.1	SA + 100001	1	Byte	0=OFF, 1=ON
DI Ch.2	SA + 100002	1	Byte	0=OFF, 1=ON
DI Ch.3	SA + 100003	1	Byte	0=OFF, 1=ON
DI Ch.4	SA + 100004	1	Byte	0=OFF, 1=ON
[3x] Input Register, Unit : Register(16 Bits)				
DI Counter 0	SA + 300000	1	UInt16	0~65535
DI Counter 1	SA + 300001	1	UInt16	0~65535
DI Counter 2	SA + 300002	1	UInt16	0~65535
DI Counter 3	SA + 300003	1	UInt16	0~65535
DI Counter 4	SA + 300004	1	UInt16	0~65535
[4x] Holding Register, Unit : Register(16 Bits)				
AO Ch.0	SA + 400000	2	Float	Floating Point
AO Ch.1	SA + 400002	2	Float	Floating Point
AO Ch.2	SA + 400004	2	Float	Floating Point
AO Ch.3	SA + 400006	2	Float	Floating Point

- **M-7000 DI/DO Module (Maximum 16 DI channel / 16 DO channel)**

  By the channel numbers of M-7000 DI/DO Module, the user can look up the address of the M-7000 DI/DO Module channel from the following table:

Parameter Name	Modbus Address	Length	Data Type	Range
[0x] Coil Output, Unit : Coil(8 Bits)				
DO Ch.0	SA + 000000	1	Byte	0=OFF, 1=ON
DO Ch.1	SA + 000001	1	Byte	0=OFF, 1=ON
DO Ch.2	SA + 000002	1	Byte	0=OFF, 1=ON
DO Ch.3	SA + 000003	1	Byte	0=OFF, 1=ON
DO Ch.4	SA + 000004	1	Byte	0=OFF, 1=ON
DO Ch.5	SA + 000005	1	Byte	0=OFF, 1=ON
DO Ch.6	SA + 000006	1	Byte	0=OFF, 1=ON
DO Ch.7	SA + 000007	1	Byte	0=OFF, 1=ON

DO Ch.8	SA + 000008	1	Byte	0=OFF, 1=ON
DO Ch.9	SA + 000009	1	Byte	0=OFF, 1=ON
DO Ch.10	SA + 000010	1	Byte	0=OFF, 1=ON
DO Ch.11	SA + 000011	1	Byte	0=OFF, 1=ON
DO Ch.12	SA + 000012	1	Byte	0=OFF, 1=ON
DO Ch.13	SA + 000013	1	Byte	0=OFF, 1=ON
DO Ch.14	SA + 000014	1	Byte	0=OFF, 1=ON
DO Ch.15	SA + 000015	1	Byte	0=OFF, 1=ON
[1x] Discrete Input, Unit : Coil (8 Bits)				
DI Ch.0	SA + 100000	1	Byte	0=OFF, 1=ON
DI Ch.1	SA + 100001	1	Byte	0=OFF, 1=ON
DI Ch.2	SA + 100002	1	Byte	0=OFF, 1=ON
DI Ch.3	SA + 100003	1	Byte	0=OFF, 1=ON
DI Ch.4	SA + 100004	1	Byte	0=OFF, 1=ON
DI Ch.5	SA + 100005	1	Byte	0=OFF, 1=ON
DI Ch.6	SA + 100006	1	Byte	0=OFF, 1=ON
DI Ch.7	SA + 100007	1	Byte	0=OFF, 1=ON
DI Ch.8	SA + 100008	1	Byte	0=OFF, 1=ON
DI Ch.9	SA + 100009	1	Byte	0=OFF, 1=ON
DI Ch.10	SA + 100010	1	Byte	0=OFF, 1=ON
DI Ch.11	SA + 100011	1	Byte	0=OFF, 1=ON
DI Ch.12	SA + 100012	1	Byte	0=OFF, 1=ON
DI Ch.13	SA + 100013	1	Byte	0=OFF, 1=ON
DI Ch.14	SA + 100014	1	Byte	0=OFF, 1=ON
DI Ch.15	SA + 100015	1	Byte	0=OFF, 1=ON
[3x] Input Register, Unit : Register(16 Bits)				
DI Counter 0	SA + 300000	1	UInt16	0~65535
DI Counter 1	SA + 300001	1	UInt16	0~65535
DI Counter 2	SA + 300002	1	UInt16	0~65535
DI Counter 3	SA + 300003	1	UInt16	0~65535
DI Counter 4	SA + 300004	1	UInt16	0~65535
DI Counter 5	SA + 300005	1	UInt16	0~65535
DI Counter 6	SA + 300006	1	UInt16	0~65535
DI Counter 7	SA + 300007	1	UInt16	0~65535
DI Counter 8	SA + 300008	1	UInt16	0~65535
DI Counter 9	SA + 300009	1	UInt16	0~65535
DI Counter 10	SA + 300010	1	UInt16	0~65535

DI Counter 11	SA + 300011	1	UInt16	0~65535
DI Counter 12	SA + 300012	1	UInt16	0~65535
DI Counter 13	SA + 300013	1	UInt16	0~65535
DI Counter 14	SA + 300014	1	UInt16	0~65535
DI Counter 15	SA + 300015	1	UInt16	0~65535

- **M-7080、M-7080B (2 Counter/Frequency、2 DO channel)**

Parameter Name	Modbus Address	Length	Data Type	Range
[0x] Coils Output, Unit : Coil(8 Bits)				
DO Ch.0	SA + 000000	1	Byte	0=OFF, 1=ON
DO Ch.1	SA + 000001	1	Byte	0=OFF, 1=ON
[3x] Input Register, Unit : Register(16 Bits)				
DI Counter 0	SA + 300000	2	UInt32	0~4294967295
DI Counter 1	SA + 300002	2	UInt32	0~4294967295

- **M-7084 (8 Counter/Frequency)**

Parameter Name	Modbus Address	Length	Data Type	Range
[3x] Input Register, Unit : Register(16 Bits)				
DI Counter 0	SA + 300000	2	UInt32	0~4294967295
DI Counter 1	SA + 300002	2	UInt32	0~4294967295
DI Counter 2	SA + 300004	2	UInt32	0~4294967295
DI Counter 3	SA + 300006	2	UInt32	0~4294967295
DI Counter 4	SA + 300008	2	UInt32	0~4294967295
DI Counter 5	SA + 300010	2	UInt32	0~4294967295
DI Counter 6	SA + 300012	2	UInt32	0~4294967295
DI Counter 7	SA + 300014	2	UInt32	0~4294967295

- **M-7088 (8 DI、8 PWM Output channel)**

Parameter Name	Modbus Address	Length	Data Type	Range
[0x] Coils Output, Unit : Coil(8 Bits)				
PWM Output Ch.0	SA + 000000	1	Byte	0=OFF, 1=ON
PWM Output Ch.1	SA + 000001	1	Byte	0=OFF, 1=ON

PWM Output Ch.2	SA + 000002	1	Byte	0=OFF, 1=ON
PWM Output Ch.3	SA + 000003	1	Byte	0=OFF, 1=ON
PWM Output Ch.4	SA + 000004	1	Byte	0=OFF, 1=ON
PWM Output Ch.5	SA + 000005	1	Byte	0=OFF, 1=ON
PWM Output Ch.6	SA + 000006	1	Byte	0=OFF, 1=ON
PWM Output Ch.7	SA + 000007	1	Byte	0=OFF, 1=ON
[1x] Discrete Input, Unit : Coil (8 Bits)				
DI Ch.0	SA + 100000	1	Byte	0=OFF, 1=ON
DI Ch.1	SA + 100001	1	Byte	0=OFF, 1=ON
DI Ch.2	SA + 100002	1	Byte	0=OFF, 1=ON
DI Ch.3	SA + 100003	1	Byte	0=OFF, 1=ON
DI Ch.4	SA + 100004	1	Byte	0=OFF, 1=ON
DI Ch.5	SA + 100005	1	Byte	0=OFF, 1=ON
DI Ch.6	SA + 100006	1	Byte	0=OFF, 1=ON
DI Ch.7	SA + 100007	1	Byte	0=OFF, 1=ON
[3x] Input Register, Unit : Register(16 Bits)				
DI Counter 0	SA + 300000	2	UInt32	0~4294967295
DI Counter 1	SA + 300002	2	UInt32	0~4294967295
DI Counter 2	SA + 300004	2	UInt32	0~4294967295
DI Counter 3	SA + 300006	2	UInt32	0~4294967295
DI Counter 4	SA + 300008	2	UInt32	0~4294967295
DI Counter 5	SA + 300010	2	UInt32	0~4294967295
DI Counter 6	SA + 300012	2	UInt32	0~4294967295
DI Counter 7	SA + 300014	2	UInt32	0~4294967295

- **PM-2133**

Parameter Name		Modbus Address	Length	Data Type	Range
[3x] Input Register, Unit : Register(16 Bits)					
Phase A	V	SA + 300000	2	Float	Floating Point
	I	SA + 300002	2	Float	Floating Point
	kW	SA + 300004	2	Float	Floating Point
	kvar	SA + 300006	2	Float	Floating Point
	kVA	SA + 300008	2	Float	Floating Point
	PF	SA + 300010	2	Float	Floating Point
	kWh	SA + 300012	2	Float	Floating Point
	kvarh	SA + 300014	2	Float	Floating Point
	kVAh	SA + 300016	2	Float	Floating Point
Phase B	V	SA + 300018	2	Float	Floating Point
	I	SA + 300020	2	Float	Floating Point
	kW	SA + 300022	2	Float	Floating Point
	kvar	SA + 300024	2	Float	Floating Point
	kVA	SA + 300026	2	Float	Floating Point
	PF	SA + 300028	2	Float	Floating Point
	kWh	SA + 300030	2	Float	Floating Point
	kvarh	SA + 300032	2	Float	Floating Point
	kVAh	SA + 300034	2	Float	Floating Point
Phase C	V	SA + 300036	2	Float	Floating Point
	I	SA + 300038	2	Float	Floating Point
	kW	SA + 300040	2	Float	Floating Point
	kvar	SA + 300042	2	Float	Floating Point
	kVA	SA + 300044	2	Float	Floating Point
	PF	SA + 300046	2	Float	Floating Point
	kWh	SA + 300048	2	Float	Floating Point
	kvarh	SA + 300050	2	Float	Floating Point
	kVAh	SA + 300052	2	Float	Floating Point
Total / Average	V	SA + 300054	2	Float	Floating Point
	I	SA + 300056	2	Float	Floating Point
	kW	SA + 300058	2	Float	Floating Point
	kvar	SA + 300060	2	Float	Floating Point
	kVA	SA + 300062	2	Float	Floating Point

	PF	SA + 300064	2	Float	Floating Point
	kWh	SA + 300066	2	Float	Floating Point
	kvarh	SA + 300068	2	Float	Floating Point
	kVAh	SA + 300070	2	Float	Floating Point
Phase A	15/30/60 mins Actual Demand	SA + 300072	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300074	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300076	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300078	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300080	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300082	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300084	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300086	2	Float	Floating Point
Phase B	15/30/60 mins Actual Demand	SA + 300088	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300090	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300092	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300094	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300096	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300098	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300100	2	Float	Floating Point

	Yearly Accumulated Electricity	SA + 300102	2	Float	Floating Point
Phase C	15/30/60 mins Actual Demand	SA + 300104	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300106	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300108	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300110	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300112	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300114	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300116	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300118	2	Float	Floating Point
Total / Average	15/30/60 mins Actual Demand	SA + 300120	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300122	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300124	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300126	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300128	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300130	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300132	2	Float	Floating Point

	Yearly Accumulated Electricity	SA + 300134	2	Float	Floating Point
[3x] Input Register, Unit : Register(16 Bits)					
Power Meter Type		PM_SA + 300000	1	Int16	2133
Reserved		PM_SA + 300001	1	-	Reserved
Reserved		PM_SA + 300002	1	-	Reserved
Firmware Version		PM_SA + 300003	1	BCD	0x0100~
Address		PM_SA + 300004	1	UInt16	1~247
Error Code		PM_SA + 300005	1	UInt16	-1=Initializing 0=Failed 1=Success
Reserved		PM_SA + 300011	1	-	Reserved
PT Ratio		PM_SA + 300012	2	Float	0.01~655.35
CTRatio		PM_SA + 300014	2	Float	1~65535

- **PM-2134**

Parameter Name		Modbus Address	Length	Data Type	Range
[3x]Input Register, Unit : Register(16 Bits)					
CT1	V	SA + 300000	2	Float	Floating Point
	I	SA + 300002	2	Float	Floating Point
	kW	SA + 300004	2	Float	Floating Point
	kvar	SA + 300006	2	Float	Floating Point
	kVA	SA + 300008	2	Float	Floating Point
	PF	SA + 300010	2	Float	Floating Point
	kWh	SA + 300012	2	Float	Floating Point
	kvarh	SA + 300014	2	Float	Floating Point
	kVAh	SA + 300016	2	Float	Floating Point
CT2	V	SA + 300018	2	Float	Floating Point
	I	SA + 300020	2	Float	Floating Point
	kW	SA + 300022	2	Float	Floating Point
	kvar	SA + 300024	2	Float	Floating Point
	kVA	SA + 300026	2	Float	Floating Point
	PF	SA + 300028	2	Float	Floating Point

	kWh	SA + 300030	2	Float	Floating Point
	kvarh	SA + 300032	2	Float	Floating Point
	kVAh	SA + 300034	2	Float	Floating Point
CT3	V	SA + 300036	2	Float	Floating Point
	I	SA + 300038	2	Float	Floating Point
	kW	SA + 300040	2	Float	Floating Point
	kvar	SA + 300042	2	Float	Floating Point
	kVA	SA + 300044	2	Float	Floating Point
	PF	SA + 300046	2	Float	Floating Point
	kWh	SA + 300048	2	Float	Floating Point
	kvarh	SA + 300050	2	Float	Floating Point
	kVAh	SA + 300052	2	Float	Floating Point
CT4	V	SA + 300054	2	Float	Floating Point
	I	SA + 300056	2	Float	Floating Point
	kW	SA + 300058	2	Float	Floating Point
	kvar	SA + 300060	2	Float	Floating Point
	kVA	SA + 300062	2	Float	Floating Point
	PF	SA + 300064	2	Float	Floating Point
	kWh	SA + 300066	2	Float	Floating Point
	kvarh	SA + 300068	2	Float	Floating Point
	kVAh	SA + 300070	2	Float	Floating Point
CT1	15/30/60 mins Actual Demand	SA + 300072	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300074	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300076	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300078	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300080	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300082	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300084	2	Float	Floating Point

	Yearly Accumulated Electricity	SA + 300086	2	Float	Floating Point
CT2	15/30/60 mins Actual Demand	SA + 300088	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300090	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300092	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300094	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300096	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300098	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300100	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300102	2	Float	Floating Point
CT3	15/30/60 mins Actual Demand	SA + 300104	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300106	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300108	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300110	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300112	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300114	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300116	2	Float	Floating Point

	Yearly Accumulated Electricity	SA + 300118	2	Float	Floating Point
CT4	15/30/60 mins Actual Demand	SA + 300120	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300122	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300124	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300126	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300128	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300130	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300132	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300134	2	Float	Floating Point

[3x]Input Register, Unit : Register(16 Bits)				
Power Meter Type	PM_SA + 300000	1	Int16	2134
Reserved	PM_SA + 300001	1	-	Reserved
Reserved	PM_SA + 300002	1	-	Reserved
Firmware Version	PM_SA + 300003	1	BCD	0x0100~
Address	PM_SA + 300004	1	UInt16	1~247
Error Code	PM_SA + 300005	1	UInt16	-1=Initializing 0=Failed 1=Success
Reserved	PM_SA + 300011	1	-	Reserved
PT Ratio	PM_SA + 300012	2	Float	0.01~655.35
CTRatio	PM_SA + 300014	2	Float	1~65535

- **PM-3133、PM-3133-MTCP**

Parameter Name		Modbus Address	Length	Data Type	Range
[0x] Coils Output, Unit : Coil(8 Bits)					
DO Ch.0		SA + 000000	1	Byte	0=OFF, 1=ON
DO Ch.1		SA + 000001	1	Byte	0=OFF, 1=ON
[4x] Holding Register, Unit : Register(16 Bits)					
Harmonic Selector		SA + 400000	1	UInt16	0: Disable 1: Phase A 2: Phase B 3: Phase C
[3x] Input Register, Unit : Register(16 Bits)					
Phase A	V	SA + 300000	2	Float	Floating Point
	I	SA + 300002	2	Float	Floating Point
	kW	SA + 300004	2	Float	Floating Point
	kvar	SA + 300006	2	Float	Floating Point
	kVA	SA + 300008	2	Float	Floating Point
	PF	SA + 300010	2	Float	Floating Point
	kWh	SA + 300012	2	Float	Floating Point
	kvarh	SA + 300014	2	Float	Floating Point
	kVAh	SA + 300016	2	Float	Floating Point
Phase B	V	SA + 300018	2	Float	Floating Point
	I	SA + 300020	2	Float	Floating Point
	kW	SA + 300022	2	Float	Floating Point
	kvar	SA + 300024	2	Float	Floating Point
	kVA	SA + 300026	2	Float	Floating Point
	PF	SA + 300028	2	Float	Floating Point
	kWh	SA + 300030	2	Float	Floating Point
	kvarh	SA + 300032	2	Float	Floating Point
	kVAh	SA + 300034	2	Float	Floating Point
Phase C	V	SA + 300036	2	Float	Floating Point
	I	SA + 300038	2	Float	Floating Point
	kW	SA + 300040	2	Float	Floating Point
	kvar	SA + 300042	2	Float	Floating Point
	kVA	SA + 300044	2	Float	Floating Point
	PF	SA + 300046	2	Float	Floating Point

	kWh	SA + 300048	2	Float	Floating Point
	kvarh	SA + 300050	2	Float	Floating Point
	kVAh	SA + 300052	2	Float	Floating Point
Total / Average	V	SA + 300054	2	Float	Floating Point
	I	SA + 300056	2	Float	Floating Point
	kW	SA + 300058	2	Float	Floating Point
	kvar	SA + 300060	2	Float	Floating Point
	kVA	SA + 300062	2	Float	Floating Point
	PF	SA + 300064	2	Float	Floating Point
	kWh	SA + 300066	2	Float	Floating Point
	kvarh	SA + 300068	2	Float	Floating Point
	kVAh	SA + 300070	2	Float	Floating Point
Phase A	15/30/60 mins Actual Demand	SA + 300072	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300074	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300076	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300078	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300080	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300082	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300084	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300086	2	Float	Floating Point
Phase B	15/30/60 mins Actual Demand	SA + 300088	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300090	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300092	2	Float	Floating Point
	Max. Demand	SA + 300094	2	Float	Floating Point

	(Daily)				
	Max. Demand (Monthly)	SA + 300096	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300098	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300100	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300102	2	Float	Floating Point
Phase C	15/30/60 mins Actual Demand	SA + 300104	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300106	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300108	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300110	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300112	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300114	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300116	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300118	2	Float	Floating Point
Total / Average	15/30/60 mins Actual Demand	SA + 300120	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300122	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300124	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300126	2	Float	Floating Point

	Max. Demand (Monthly)	SA + 300128	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300130	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300132	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300134	2	Float	Floating Point
[3x] Input Register, Unit : Register(16 Bits)					
VTHD		SA + 300136	2	Float	Floating Point
ITHD		SA + 300138	2	Float	Floating Point
[3x] Input Register, Unit : Register(16 Bits)					
Power Meter Type		PM_SA + 300000	1	Int16	3133
Reserved		PM_SA + 300001	1	-	Reserved
Reserved		PM_SA + 300002	1	-	Reserved
Firmware Version		PM_SA + 300003	1	BCD	0x0100~
Address / NetID		PM_SA + 300004	1	UInt16	1~247
Error Code		PM_SA + 300005	1	UInt16	-1=Initializing 0=Failed 1=Success
IP1		PM_SA + 300006	1	Int16	0~255
IP2		PM_SA + 300007	1	Int16	0~255
IP3		PM_SA + 300008	1	Int16	0~255
IP4		PM_SA + 300009	1	Int16	0~255
Port Number		PM_SA + 300010	1	UInt16	1~65535
Reserved		PM_SA + 300011	1	-	Reserved
PT Ratio		PM_SA + 300012	2	Float	0.01~655.35
CT Ratio		PM_SA + 300014	2	Float	1~65535

- **PM-3112、PM-3112-MTCP (2 Loops 1 Phase)**

Parameter Name		Modbus Address	Length	Data Type	Range
[0x] Coils Output, Unit : Coil(8 Bits)					
DO Ch.0		SA + 000000	1	Byte	0=OFF, 1=ON
DO Ch.1		SA + 000001	1	Byte	0=OFF, 1=ON
[3x] Input Register, Unit : Register(16 Bits)					
CT1	V	SA + 300000	2	Float	Floating Point
	I	SA + 300002	2	Float	Floating Point
	kW	SA + 300004	2	Float	Floating Point
	kvar	SA + 300006	2	Float	Floating Point
	kVA	SA + 300008	2	Float	Floating Point
	PF	SA + 300010	2	Float	Floating Point
	kWh	SA + 300012	2	Float	Floating Point
	kvarh	SA + 300014	2	Float	Floating Point
	kVAh	SA + 300016	2	Float	Floating Point
CT2	V	SA + 300018	2	Float	Floating Point
	I	SA + 300020	2	Float	Floating Point
	kW	SA + 300022	2	Float	Floating Point
	kvar	SA + 300024	2	Float	Floating Point
	kVA	SA + 300026	2	Float	Floating Point
	PF	SA + 300028	2	Float	Floating Point
	kWh	SA + 300030	2	Float	Floating Point
	kvarh	SA + 300032	2	Float	Floating Point
	kVAh	SA + 300034	2	Float	Floating Point
CT1	15/30/60 mins Actual Demand	SA + 300036	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300038	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300040	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300042	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300044	2	Float	Floating Point
	Daily Accumulated	SA + 300046	2	Float	Floating Point

	Electricity				
	Monthly Accumulated Electricity	SA + 300048	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300050	2	Float	Floating Point
CT2	15/30/60 mins Actual Demand	SA + 300052	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300054	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300056	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300058	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300060	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300062	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300064	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300066	2	Float	Floating Point
[3x] Input Register, Unit : Register(16 Bits)					
Power Meter Type		PM_SA + 300000	1	Int16	3112
Reserved		PM_SA + 300001	1	-	Reserved
Reserved		PM_SA + 300002	1	-	Reserved
Firmware Version		PM_SA + 300003	1	BCD	0x0100~
Address / NetID		PM_SA + 300004	1	UInt16	1~247
Error Code		PM_SA + 300005	1	UInt16	-1=Initializing 0=Failed 1=Success
IP1		PM_SA + 300006	1	Int16	0~255
IP2		PM_SA + 300007	1	Int16	0~255
IP3		PM_SA + 300008	1	Int16	0~255

IP4	PM_SA + 300009	1	Int16	0~255
Port Number	PM_SA + 300010	1	UInt16	1~65535
Reserved	PM_SA + 300011	1	-	Reserved
PT Ratio	PM_SA + 300012	2	Float	0.01~655.35
CT Ratio	PM_SA + 300014	2	Float	1~65535

- **PM-3114、PM-3114-MTCP (4 Loops 1 Phase)**

Parameter Name		Modbus Address	Length	Data Type	Range
[0x] Coils Output, Unit : Coil(8 Bits)					
DO Ch.0		SA + 000000	1	Byte	0=OFF, 1=ON
DO Ch.1		SA + 000001	1	Byte	0=OFF, 1=ON
[3x] Input Register, Unit : Register(16 Bits)					
CT1	V	SA + 300000	2	Float	Floating Point
	I	SA + 300002	2	Float	Floating Point
	kW	SA + 300004	2	Float	Floating Point
	kvar	SA + 300006	2	Float	Floating Point
	kVA	SA + 300008	2	Float	Floating Point
	PF	SA + 300010	2	Float	Floating Point
	kWh	SA + 300012	2	Float	Floating Point
	kvarh	SA + 300014	2	Float	Floating Point
	kVAh	SA + 300016	2	Float	Floating Point
CT2	V	SA + 300018	2	Float	Floating Point
	I	SA + 300020	2	Float	Floating Point
	kW	SA + 300022	2	Float	Floating Point
	kvar	SA + 300024	2	Float	Floating Point
	kVA	SA + 300026	2	Float	Floating Point
	PF	SA + 300028	2	Float	Floating Point
	kWh	SA + 300030	2	Float	Floating Point
	kvarh	SA + 300032	2	Float	Floating Point
	kVAh	SA + 300034	2	Float	Floating Point
CT3	V	SA + 300036	2	Float	Floating Point
	I	SA + 300038	2	Float	Floating Point
	kW	SA + 300040	2	Float	Floating Point
	kvar	SA + 300042	2	Float	Floating Point
	kVA	SA + 300044	2	Float	Floating Point

	PF	SA + 300046	2	Float	Floating Point
	kWh	SA + 300048	2	Float	Floating Point
	kvarh	SA + 300050	2	Float	Floating Point
	kVAh	SA + 300052	2	Float	Floating Point

CT4	V	SA + 300054	2	Float	Floating Point
	I	SA + 300056	2	Float	Floating Point
	kW	SA + 300058	2	Float	Floating Point
	kvar	SA + 300060	2	Float	Floating Point
	kVA	SA + 300062	2	Float	Floating Point
	PF	SA + 300064	2	Float	Floating Point
	kWh	SA + 300066	2	Float	Floating Point
	kvarh	SA + 300068	2	Float	Floating Point
	kVAh	SA + 300070	2	Float	Floating Point
CT1	15/30/60 mins Actual Demand	SA + 300072	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300074	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300076	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300078	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300080	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300082	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300084	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300086	2	Float	Floating Point
CT2	15/30/60 mins Actual Demand	SA + 300088	2	Float	Floating Point
	15/30/60 mins	SA + 300090	2	Float	Floating Point

	Forecast Demand				
	Max. Demand (Hourly)	SA + 300092	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300094	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300096	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300098	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300100	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300102	2	Float	Floating Point
CT3	15/30/60 mins Actual Demand	SA + 300104	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300106	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300108	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300110	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300112	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300114	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300116	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300118	2	Float	Floating Point
CT4	15/30/60 mins Actual Demand	SA + 300120	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300122	2	Float	Floating Point

	Max. Demand (Hourly)	SA + 300124	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300126	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300128	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300130	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300132	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300134	2	Float	Floating Point
[3x] Input Register, Unit : Register(16 Bits)					
Power Meter Type		PM_SA + 300000	1	Int16	3114
Reserved		PM_SA + 300001	1	-	Reserved
Reserved		PM_SA + 300002	1	-	Reserved
Firmware Version		PM_SA + 300003	1	BCD	0x0100~
Address / NetID		PM_SA + 300004	1	UInt16	1~247
Error Code		PM_SA + 300005	1	UInt16	-1=Initializing 0=Failed 1=Success
IP1		PM_SA + 300006	1	Int16	0~255
IP2		PM_SA + 300007	1	Int16	0~255
IP3		PM_SA + 300008	1	Int16	0~255
IP4		PM_SA + 300009	1	Int16	0~255
Port Number		PM_SA + 300010	1	UInt16	1~65535
Reserved		PM_SA + 300011	1	-	Reserved
PT Ratio		PM_SA + 300012	2	Float	0.01~655.35
CT Ratio		PM_SA + 300014	2	Float	1~65535

- **PM-4324**

Parameter Name	Modbus Address	Length	Data Type	Range
[0x] Coils Output, Unit : Coil(8 Bits)				
DO Ch.0	SA + 000000	1	Byte	0=OFF, 1=ON
DO Ch.1	SA + 000001	1	Byte	0=OFF, 1=ON
[4x] Holding Register, Unit : Register(16 Bits)				
Harmonic Selector [Submeter 1]	SA + 400000	1	UInt16	0: Disable 1: Phase A / CT1 2: Phase B / CT2 3: Phase C / CT3
Harmonic Selector [Submeter 2]	SA + 400001	1	UInt16	0: Disable 1: Phase A / CT4 2: Phase B / CT5 3: Phase C / CT6
Harmonic Selector [Submeter 3]	SA + 400002	1	UInt16	0: Disable 1: Phase A / CT7 2: Phase B / CT8 3: Phase C / CT9
Harmonic Selector [Submeter 4]	SA + 400003	1	UInt16	0: Disable 1: Phase A / CT10 2: Phase B / CT11 3: Phase C / CT12
Harmonic Selector [Submeter 5]	SA + 400004	1	UInt16	0: Disable 1: Phase A / CT13 2: Phase B / CT14 3: Phase C / CT15
Harmonic Selector [Submeter 6]	SA + 400005	1	UInt16	0: Disable 1: Phase A / CT16 2: Phase B / CT17 3: Phase C / CT18
Harmonic Selector [Submeter 7]	SA + 400006	1	UInt16	0: Disable 1: Phase A / CT19 2: Phase B / CT20 3: Phase C / CT21

Harmonic Selector [Submeter 8]		SA + 400007	1	UInt16	0: Disable 1: Phase A / CT22 2: Phase B / CT23 3: Phase C / CT24
[3x] Input Register, Unit : Register(16 Bits)					
Submeter 1					
Phase A / CT1	V	SA + 300000	2	Float	Floating Point
	I	SA + 300002	2	Float	Floating Point
	kW	SA + 300004	2	Float	Floating Point
	kvar	SA + 300006	2	Float	Floating Point
	kVA	SA + 300008	2	Float	Floating Point
	PF	SA + 300010	2	Float	Floating Point
	kWh	SA + 300012	2	Float	Floating Point
	kvarh	SA + 300014	2	Float	Floating Point
	kVAh	SA + 300016	2	Float	Floating Point
Phase B / CT2	V	SA + 300018	2	Float	Floating Point
	I	SA + 300020	2	Float	Floating Point
	kW	SA + 300022	2	Float	Floating Point
	kvar	SA + 300024	2	Float	Floating Point
	kVA	SA + 300026	2	Float	Floating Point
	PF	SA + 300028	2	Float	Floating Point
	kWh	SA + 300030	2	Float	Floating Point
	kvarh	SA + 300032	2	Float	Floating Point
	kVAh	SA + 300034	2	Float	Floating Point
Phase C / CT3	V	SA + 300036	2	Float	Floating Point
	I	SA + 300038	2	Float	Floating Point
	kW	SA + 300040	2	Float	Floating Point
	kvar	SA + 300042	2	Float	Floating Point
	kVA	SA + 300044	2	Float	Floating Point
	PF	SA + 300046	2	Float	Floating Point
	kWh	SA + 300048	2	Float	Floating Point
	kvarh	SA + 300050	2	Float	Floating Point
	kVAh	SA + 300052	2	Float	Floating Point

Total / Average	V	SA + 300054	2	Float	Floating Point
	I	SA + 300056	2	Float	Floating Point
	kW	SA + 300058	2	Float	Floating Point
	kvar	SA + 300060	2	Float	Floating Point
	kVA	SA + 300062	2	Float	Floating Point
	PF	SA + 300064	2	Float	Floating Point
	kWh	SA + 300066	2	Float	Floating Point
	kvarh	SA + 300068	2	Float	Floating Point
	kVAh	SA + 300070	2	Float	Floating Point
Submeter 2					
Phase A / CT4	V	SA + 300072	2	Float	Floating Point
	I	SA + 300074	2	Float	Floating Point
	kW	SA + 300076	2	Float	Floating Point
	kvar	SA + 300078	2	Float	Floating Point
	kVA	SA + 300080	2	Float	Floating Point
	PF	SA + 300082	2	Float	Floating Point
	kWh	SA + 300084	2	Float	Floating Point
	kvarh	SA + 300086	2	Float	Floating Point
	kVAh	SA + 300088	2	Float	Floating Point
Phase B / CT5	V	SA + 300090	2	Float	Floating Point
	I	SA + 300092	2	Float	Floating Point
	kW	SA + 300094	2	Float	Floating Point
	kvar	SA + 300096	2	Float	Floating Point
	kVA	SA + 300098	2	Float	Floating Point
	PF	SA + 300100	2	Float	Floating Point
	kWh	SA + 300102	2	Float	Floating Point
	kvarh	SA + 300104	2	Float	Floating Point
	kVAh	SA + 300106	2	Float	Floating Point
Phase C / CT6	V	SA + 300108	2	Float	Floating Point
	I	SA + 300110	2	Float	Floating Point
	kW	SA + 300112	2	Float	Floating Point
	kvar	SA + 300114	2	Float	Floating Point
	kVA	SA + 300116	2	Float	Floating Point
	PF	SA + 300118	2	Float	Floating Point
	kWh	SA + 300120	2	Float	Floating Point
	kvarh	SA + 300122	2	Float	Floating Point

	kVAh	SA + 300124	2	Float	Floating Point
Total / Average	V	SA + 300126	2	Float	Floating Point
	I	SA + 300128	2	Float	Floating Point
	kW	SA + 300130	2	Float	Floating Point
	kvar	SA + 300132	2	Float	Floating Point
	kVA	SA + 300134	2	Float	Floating Point
	PF	SA + 300136	2	Float	Floating Point
	kWh	SA + 300138	2	Float	Floating Point
	kvarh	SA + 300140	2	Float	Floating Point
	kVAh	SA + 300142	2	Float	Floating Point
Submeter 3					
Phase A / CT7	V	SA + 300144	2	Float	Floating Point
	I	SA + 300146	2	Float	Floating Point
	kW	SA + 300148	2	Float	Floating Point
	kvar	SA + 300150	2	Float	Floating Point
	kVA	SA + 300152	2	Float	Floating Point
	PF	SA + 300154	2	Float	Floating Point
	kWh	SA + 300156	2	Float	Floating Point
	kvarh	SA + 300158	2	Float	Floating Point
	kVAh	SA + 300160	2	Float	Floating Point
Phase B / CT8	V	SA + 300162	2	Float	Floating Point
	I	SA + 300164	2	Float	Floating Point
	kW	SA + 300166	2	Float	Floating Point
	kvar	SA + 300168	2	Float	Floating Point
	kVA	SA + 300170	2	Float	Floating Point
	PF	SA + 300172	2	Float	Floating Point
	kWh	SA + 300174	2	Float	Floating Point
	kvarh	SA + 300176	2	Float	Floating Point
	kVAh	SA + 300178	2	Float	Floating Point
Phase C / CT9	V	SA + 300180	2	Float	Floating Point
	I	SA + 300182	2	Float	Floating Point
	kW	SA + 300184	2	Float	Floating Point
	kvar	SA + 300186	2	Float	Floating Point
	kVA	SA + 300188	2	Float	Floating Point
	PF	SA + 300190	2	Float	Floating Point
	kWh	SA + 300192	2	Float	Floating Point
	kvarh	SA + 300194	2	Float	Floating Point

	kVAh	SA + 300196	2	Float	Floating Point
Total / Average	V	SA + 300198	2	Float	Floating Point
	I	SA + 300200	2	Float	Floating Point
	kW	SA + 300202	2	Float	Floating Point
	kvar	SA + 300204	2	Float	Floating Point
	kVA	SA + 300206	2	Float	Floating Point
	PF	SA + 300208	2	Float	Floating Point
	kWh	SA + 300210	2	Float	Floating Point
	kvarh	SA + 300212	2	Float	Floating Point
	kVAh	SA + 300214	2	Float	Floating Point
Submeter 4					
Phase A / CT10	V	SA + 300216	2	Float	Floating Point
	I	SA + 300218	2	Float	Floating Point
	kW	SA + 300220	2	Float	Floating Point
	kvar	SA + 300222	2	Float	Floating Point
	kVA	SA + 300224	2	Float	Floating Point
	PF	SA + 300226	2	Float	Floating Point
	kWh	SA + 300228	2	Float	Floating Point
	kvarh	SA + 300230	2	Float	Floating Point
	kVAh	SA + 300232	2	Float	Floating Point
Phase B / CT11	V	SA + 300234	2	Float	Floating Point
	I	SA + 300236	2	Float	Floating Point
	kW	SA + 300238	2	Float	Floating Point
	kvar	SA + 300240	2	Float	Floating Point
	kVA	SA + 300242	2	Float	Floating Point
	PF	SA + 300244	2	Float	Floating Point
	kWh	SA + 300246	2	Float	Floating Point
	kvarh	SA + 300248	2	Float	Floating Point
	kVAh	SA + 300250	2	Float	Floating Point
Phase C / CT12	V	SA + 300252	2	Float	Floating Point
	I	SA + 300254	2	Float	Floating Point
	kW	SA + 300256	2	Float	Floating Point
	kvar	SA + 300258	2	Float	Floating Point
	kVA	SA + 300260	2	Float	Floating Point
	PF	SA + 300262	2	Float	Floating Point
	kWh	SA + 300264	2	Float	Floating Point
	kvarh	SA + 300266	2	Float	Floating Point

	kVAh	SA + 300268	2	Float	Floating Point
Total / Average	V	SA + 300270	2	Float	Floating Point
	I	SA + 300272	2	Float	Floating Point
	kW	SA + 300274	2	Float	Floating Point
	kvar	SA + 300276	2	Float	Floating Point
	kVA	SA + 300278	2	Float	Floating Point
	PF	SA + 300280	2	Float	Floating Point
	kWh	SA + 300282	2	Float	Floating Point
	kvarh	SA + 300284	2	Float	Floating Point
	kVAh	SA + 300286	2	Float	Floating Point
Submeter 5					
Phase A / CT13	V	SA + 300288	2	Float	Floating Point
	I	SA + 300290	2	Float	Floating Point
	kW	SA + 300292	2	Float	Floating Point
	kvar	SA + 300294	2	Float	Floating Point
	kVA	SA + 300296	2	Float	Floating Point
	PF	SA + 300298	2	Float	Floating Point
	kWh	SA + 300300	2	Float	Floating Point
	kvarh	SA + 300302	2	Float	Floating Point
	kVAh	SA + 300304	2	Float	Floating Point
Phase B / CT14	V	SA + 300306	2	Float	Floating Point
	I	SA + 300308	2	Float	Floating Point
	kW	SA + 300310	2	Float	Floating Point
	kvar	SA + 300312	2	Float	Floating Point
	kVA	SA + 300314	2	Float	Floating Point
	PF	SA + 300316	2	Float	Floating Point
	kWh	SA + 300318	2	Float	Floating Point
	kvarh	SA + 300320	2	Float	Floating Point
	kVAh	SA + 300322	2	Float	Floating Point
Phase C / CT15	V	SA + 300324	2	Float	Floating Point
	I	SA + 300326	2	Float	Floating Point
	kW	SA + 300328	2	Float	Floating Point
	kvar	SA + 300330	2	Float	Floating Point
	kVA	SA + 300332	2	Float	Floating Point
	PF	SA + 300334	2	Float	Floating Point
	kWh	SA + 300336	2	Float	Floating Point
	kvarh	SA + 300338	2	Float	Floating Point

	kVAh	SA + 300340	2	Float	Floating Point
Total / Average	V	SA + 300342	2	Float	Floating Point
	I	SA + 300344	2	Float	Floating Point
	kW	SA + 300346	2	Float	Floating Point
	kvar	SA + 300348	2	Float	Floating Point
	kVA	SA + 300350	2	Float	Floating Point
	PF	SA + 300352	2	Float	Floating Point
	kWh	SA + 300354	2	Float	Floating Point
	kvarh	SA + 300356	2	Float	Floating Point
	kVAh	SA + 300358	2	Float	Floating Point
Submeter 6					
Phase A / CT16	V	SA + 300360	2	Float	Floating Point
	I	SA + 300362	2	Float	Floating Point
	kW	SA + 300364	2	Float	Floating Point
	kvar	SA + 300366	2	Float	Floating Point
	kVA	SA + 300368	2	Float	Floating Point
	PF	SA + 300370	2	Float	Floating Point
	kWh	SA + 300372	2	Float	Floating Point
	kvarh	SA + 300374	2	Float	Floating Point
	kVAh	SA + 300376	2	Float	Floating Point
Phase B / CT17	V	SA + 300378	2	Float	Floating Point
	I	SA + 300380	2	Float	Floating Point
	kW	SA + 300382	2	Float	Floating Point
	kvar	SA + 300384	2	Float	Floating Point
	kVA	SA + 300386	2	Float	Floating Point
	PF	SA + 300388	2	Float	Floating Point
	kWh	SA + 300390	2	Float	Floating Point
	kvarh	SA + 300392	2	Float	Floating Point
	kVAh	SA + 300394	2	Float	Floating Point
Phase C / CT18	V	SA + 300396	2	Float	Floating Point
	I	SA + 300398	2	Float	Floating Point
	kW	SA + 300400	2	Float	Floating Point
	kvar	SA + 300402	2	Float	Floating Point
	kVA	SA + 300404	2	Float	Floating Point
	PF	SA + 300406	2	Float	Floating Point
	kWh	SA + 300408	2	Float	Floating Point
	kvarh	SA + 300410	2	Float	Floating Point

	kVAh	SA + 300412	2	Float	Floating Point
Total / Average	V	SA + 300414	2	Float	Floating Point
	I	SA + 300416	2	Float	Floating Point
	kW	SA + 300418	2	Float	Floating Point
	kvar	SA + 300420	2	Float	Floating Point
	kVA	SA + 300422	2	Float	Floating Point
	PF	SA + 300424	2	Float	Floating Point
	kWh	SA + 300426	2	Float	Floating Point
	kvarh	SA + 300428	2	Float	Floating Point
	kVAh	SA + 300430	2	Float	Floating Point
Submeter 7					
Phase A / CT19	V	SA + 300432	2	Float	Floating Point
	I	SA + 300434	2	Float	Floating Point
	kW	SA + 300436	2	Float	Floating Point
	kvar	SA + 300438	2	Float	Floating Point
	kVA	SA + 300440	2	Float	Floating Point
	PF	SA + 300442	2	Float	Floating Point
	kWh	SA + 300444	2	Float	Floating Point
	kvarh	SA + 300446	2	Float	Floating Point
	kVAh	SA + 300448	2	Float	Floating Point
Phase B / CT20	V	SA + 300450	2	Float	Floating Point
	I	SA + 300452	2	Float	Floating Point
	kW	SA + 300454	2	Float	Floating Point
	kvar	SA + 300456	2	Float	Floating Point
	kVA	SA + 300458	2	Float	Floating Point
	PF	SA + 300460	2	Float	Floating Point
	kWh	SA + 300462	2	Float	Floating Point
	kvarh	SA + 300464	2	Float	Floating Point
	kVAh	SA + 300466	2	Float	Floating Point
Phase C / CT21	V	SA + 300468	2	Float	Floating Point
	I	SA + 300470	2	Float	Floating Point
	kW	SA + 300472	2	Float	Floating Point
	kvar	SA + 300474	2	Float	Floating Point
	kVA	SA + 300476	2	Float	Floating Point
	PF	SA + 300478	2	Float	Floating Point
	kWh	SA + 300480	2	Float	Floating Point
	kvarh	SA + 300482	2	Float	Floating Point

	kVAh	SA + 300484	2	Float	Floating Point
Total / Average	V	SA + 300486	2	Float	Floating Point
	I	SA + 300488	2	Float	Floating Point
	kW	SA + 300490	2	Float	Floating Point
	kvar	SA + 300492	2	Float	Floating Point
	kVA	SA + 300494	2	Float	Floating Point
	PF	SA + 300496	2	Float	Floating Point
	kWh	SA + 300498	2	Float	Floating Point
	kvarh	SA + 300500	2	Float	Floating Point
	kVAh	SA + 300502	2	Float	Floating Point
Submeter 8					
Phase A / CT22	V	SA + 300504	2	Float	Floating Point
	I	SA + 300506	2	Float	Floating Point
	kW	SA + 300508	2	Float	Floating Point
	kvar	SA + 300510	2	Float	Floating Point
	kVA	SA + 300512	2	Float	Floating Point
	PF	SA + 300514	2	Float	Floating Point
	kWh	SA + 300516	2	Float	Floating Point
	kvarh	SA + 300518	2	Float	Floating Point
	kVAh	SA + 300520	2	Float	Floating Point
Phase B / CT23	V	SA + 300522	2	Float	Floating Point
	I	SA + 300524	2	Float	Floating Point
	kW	SA + 300526	2	Float	Floating Point
	kvar	SA + 300528	2	Float	Floating Point
	kVA	SA + 300530	2	Float	Floating Point
	PF	SA + 300532	2	Float	Floating Point
	kWh	SA + 300534	2	Float	Floating Point
	kvarh	SA + 300536	2	Float	Floating Point
	kVAh	SA + 300538	2	Float	Floating Point
Phase C / CT24	V	SA + 300540	2	Float	Floating Point
	I	SA + 300542	2	Float	Floating Point
	kW	SA + 300544	2	Float	Floating Point
	kvar	SA + 300546	2	Float	Floating Point
	kVA	SA + 300548	2	Float	Floating Point
	PF	SA + 300550	2	Float	Floating Point
	kWh	SA + 300552	2	Float	Floating Point
	kvarh	SA + 300554	2	Float	Floating Point

	kVAh	SA + 300556	2	Float	Floating Point
Total / Average	V	SA + 300558	2	Float	Floating Point
	I	SA + 300560	2	Float	Floating Point
	kW	SA + 300562	2	Float	Floating Point
	kvar	SA + 300564	2	Float	Floating Point
	kVA	SA + 300566	2	Float	Floating Point
	PF	SA + 300568	2	Float	Floating Point
	kWh	SA + 300570	2	Float	Floating Point
	kvarh	SA + 300572	2	Float	Floating Point
	kVAh	SA + 300574	2	Float	Floating Point
Submeter 1					
Phase A / CT1	15/30/60 mins Actual Demand	SA + 300576	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300578	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300580	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300582	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300584	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300586	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300588	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300590	2	Float	Floating Point
Phase B / CT2	15/30/60 mins Actual Demand	SA + 300592	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300594	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300596	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300598	2	Float	Floating Point

	Max. Demand (Monthly)	SA + 300600	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300602	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300604	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300606	2	Float	Floating Point
Phase C / CT3	15/30/60 mins Actual Demand	SA + 300608	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300610	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300612	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300614	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300616	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300618	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300620	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300622	2	Float	Floating Point
Total / Average	15/30/60 mins Actual Demand	SA + 300624	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300626	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300628	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300630	2	Float	Floating Point

	Max. Demand (Monthly)	SA + 300632	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300634	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300636	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300638	2	Float	Floating Point
Submeter 2					
Phase A / CT4	15/30/60 mins Actual Demand	SA + 300640	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300642	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300644	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300646	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300648	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300650	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300652	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300654	2	Float	Floating Point
Phase B / CT5	15/30/60 mins Actual Demand	SA + 300656	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300658	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300660	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300662	2	Float	Floating Point

	Max. Demand (Monthly)	SA + 300664	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300666	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300668	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300670	2	Float	Floating Point
Phase C / CT6	15/30/60 mins Actual Demand	SA + 300672	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300674	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300676	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300678	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300680	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300682	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300684	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300686	2	Float	Floating Point
Total / Average	15/30/60 mins Actual Demand	SA + 300688	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300690	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300692	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300694	2	Float	Floating Point
	Max. Demand	SA + 300696	2	Float	Floating Point

	(Monthly)				
	Daily Accumulated Electricity	SA + 300698	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300700	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300702	2	Float	Floating Point
Submeter 3					
Phase A / CT7	15/30/60 mins Actual Demand	SA + 300704	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300706	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300708	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300710	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300712	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300714	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300716	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300718	2	Float	Floating Point
Phase B / CT8	15/30/60 mins Actual Demand	SA + 300720	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300722	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300724	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300726	2	Float	Floating Point

	Max. Demand (Monthly)	SA + 300728	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300730	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300732	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300734	2	Float	Floating Point
Phase C / CT9	15/30/60 mins Actual Demand	SA + 300736	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300738	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300740	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300742	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300744	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300746	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300748	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300750	2	Float	Floating Point
Total / Average	15/30/60 mins Actual Demand	SA + 300752	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300754	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300756	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300758	2	Float	Floating Point

	Max. Demand (Monthly)	SA + 300760	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300762	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300764	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300766	2	Float	Floating Point
Submeter 4					
Phase A / CT10	15/30/60 mins Actual Demand	SA + 300768	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300770	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300772	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300774	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300776	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300778	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300780	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300782	2	Float	Floating Point
Phase B / CT11	15/30/60 mins Actual Demand	SA + 300784	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300786	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300788	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300790	2	Float	Floating Point

	Max. Demand (Monthly)	SA + 300792	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300794	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300796	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300798	2	Float	Floating Point
Phase C / CT12	15/30/60 mins Actual Demand	SA + 300800	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300802	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300804	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300806	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300808	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300810	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300812	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300814	2	Float	Floating Point
Total / Average	15/30/60 mins Actual Demand	SA + 300816	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300818	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300820	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300822	2	Float	Floating Point

	Max. Demand (Monthly)	SA + 300824	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300826	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300828	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300830	2	Float	Floating Point
Submeter 5					
Phase A / CT13	15/30/60 mins Actual Demand	SA + 300832	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300834	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300836	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300838	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300840	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300842	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300844	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300846	2	Float	Floating Point
Phase B / CT14	15/30/60 mins Actual Demand	SA + 300848	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300850	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300852	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300854	2	Float	Floating Point

	Max. Demand (Monthly)	SA + 300856	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300858	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300860	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300862	2	Float	Floating Point
Phase C / CT15	15/30/60 mins Actual Demand	SA + 300864	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300866	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300868	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300870	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300872	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300874	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300876	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300878	2	Float	Floating Point
Total / Average	15/30/60 mins Actual Demand	SA + 300880	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300882	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300884	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300886	2	Float	Floating Point

	Max. Demand (Monthly)	SA + 300888	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300890	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300892	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300894	2	Float	Floating Point
Submeter 6					
Phase A / CT16	15/30/60 mins Actual Demand	SA + 300896	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300898	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300900	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300902	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300904	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300906	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300908	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300910	2	Float	Floating Point
Phase B / CT17	15/30/60 mins Actual Demand	SA + 300912	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300914	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300916	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300918	2	Float	Floating Point

	Max. Demand (Monthly)	SA + 300920	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300922	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300924	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300926	2	Float	Floating Point
Phase C / CT18	15/30/60 mins Actual Demand	SA + 300928	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300930	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300932	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300934	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300936	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300938	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300940	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300942	2	Float	Floating Point
Total / Average	15/30/60 mins Actual Demand	SA + 300944	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300946	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300948	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300950	2	Float	Floating Point

	Max. Demand (Monthly)	SA + 300952	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300954	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300956	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300958	2	Float	Floating Point
Submeter 7					
Phase A / CT19	15/30/60 mins Actual Demand	SA + 300960	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300962	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300964	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300966	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 300968	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300970	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300972	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300974	2	Float	Floating Point
Phase B / CT20	15/30/60 mins Actual Demand	SA + 300976	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300978	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300980	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300982	2	Float	Floating Point

	Max. Demand (Monthly)	SA + 300984	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 300986	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 300988	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 300990	2	Float	Floating Point
Phase C / CT21	15/30/60 mins Actual Demand	SA + 300992	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 300994	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 300996	2	Float	Floating Point
	Max. Demand (Daily)	SA + 300998	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 301000	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 301002	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 301004	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 301006	2	Float	Floating Point
Total / Average	15/30/60 mins Actual Demand	SA + 301008	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 301010	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 301012	2	Float	Floating Point
	Max. Demand (Daily)	SA + 301014	2	Float	Floating Point

	Max. Demand (Monthly)	SA + 301016	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 301018	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 301020	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 301022	2	Float	Floating Point
Submeter 8					
Phase A / CT22	15/30/60 mins Actual Demand	SA + 301024	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 301026	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 301028	2	Float	Floating Point
	Max. Demand (Daily)	SA + 301030	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 301032	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 301034	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 301036	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 301038	2	Float	Floating Point
Phase B / CT23	15/30/60 mins Actual Demand	SA + 301040	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 301042	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 301044	2	Float	Floating Point
	Max. Demand (Daily)	SA + 301046	2	Float	Floating Point

	Max. Demand (Monthly)	SA + 301048	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 301050	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 301052	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 301054	2	Float	Floating Point
Phase C / CT24	15/30/60 mins Actual Demand	SA + 301056	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 301058	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 301060	2	Float	Floating Point
	Max. Demand (Daily)	SA + 301062	2	Float	Floating Point
	Max. Demand (Monthly)	SA + 301064	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 301066	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 301068	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 301070	2	Float	Floating Point
Total / Average	15/30/60 mins Actual Demand	SA + 301072	2	Float	Floating Point
	15/30/60 mins Forecast Demand	SA + 301074	2	Float	Floating Point
	Max. Demand (Hourly)	SA + 301076	2	Float	Floating Point
	Max. Demand (Daily)	SA + 301078	2	Float	Floating Point

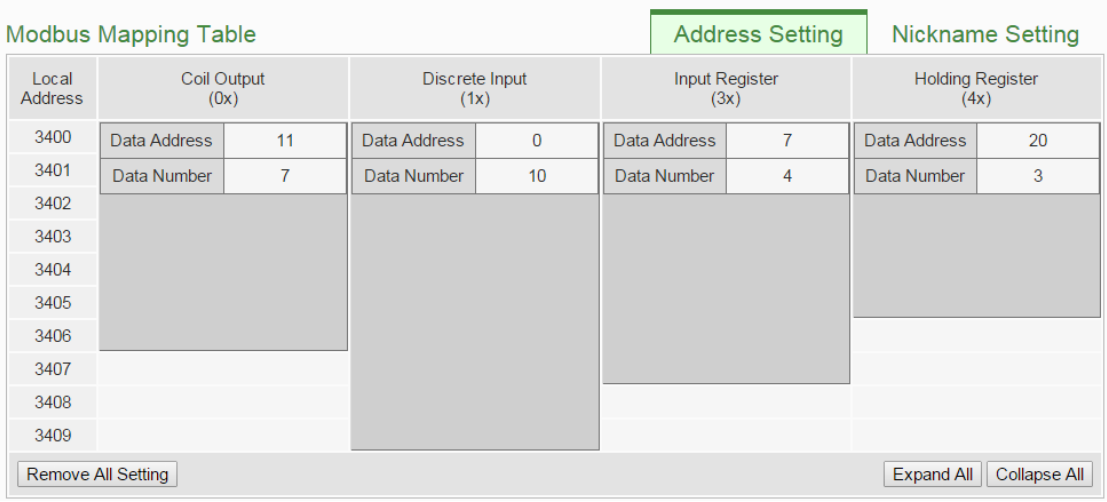
	Max. Demand (Monthly)	SA + 301080	2	Float	Floating Point
	Daily Accumulated Electricity	SA + 301082	2	Float	Floating Point
	Monthly Accumulated Electricity	SA + 301084	2	Float	Floating Point
	Yearly Accumulated Electricity	SA + 301086	2	Float	Floating Point
[3x] Input Register, Unit : Register(16 Bits)					
Submeter 1 VTHD		SA + 301088	2	Float	Floating Point
Submeter 1 ITHD		SA + 301090	2	Float	Floating Point
Submeter 2 VTHD		SA + 301092	2	Float	Floating Point
Submeter 2 ITHD		SA + 301094	2	Float	Floating Point
Submeter 3 VTHD		SA + 301096	2	Float	Floating Point
Submeter 3 ITHD		SA + 301098	2	Float	Floating Point
Submeter 4 VTHD		SA + 301100	2	Float	Floating Point
Submeter 4 ITHD		SA + 301102	2	Float	Floating Point
Submeter 5 VTHD		SA + 301104	2	Float	Floating Point
Submeter 5 ITHD		SA + 301106	2	Float	Floating Point
Submeter 6 VTHD		SA + 301108	2	Float	Floating Point
Submeter 6 ITHD		SA + 301110	2	Float	Floating Point
Submeter 7 VTHD		SA + 301112	2	Float	Floating Point

Submeter 7 ITHD	SA + 301114	2	Float	Floating Point
Submeter 8 VTHD	SA + 301116	2	Float	Floating Point
Submeter 8 ITHD	SA + 301118	2	Float	Floating Point
[3x] Input Register, Unit : Register(16 Bits)				
Power Meter Type	PM_SA + 300000	1	Int16	4324
Reserved	PM_SA + 300001	1	-	Reserved
Reserved	PM_SA + 300002	1	-	Reserved
Firmware Version	PM_SA + 300003	1	BCD	0x0100~
Address	PM_SA + 300004	1	UInt16	1~247
Error Code	PM_SA + 300005	1	UInt16	-1=Initializing 0=Failed 1=Success
Reserved	PM_SA + 300011	1	-	Reserved
PT Ratio	PM_SA + 300012	2	Float	0.01~655.35
CT Ratio [1]	PM_SA + 300014	2	Float	1~65535
CT Ratio [2]	PM_SA + 300016	2	Float	1~65535
CT Ratio [3]	PM_SA + 300018	2	Float	1~65535
CT Ratio [4]	PM_SA + 300020	2	Float	1~65535
CT Ratio [5]	PM_SA + 300022	2	Float	1~65535
CT Ratio [6]	PM_SA + 300024	2	Float	1~65535
CT Ratio [7]	PM_SA + 300026	2	Float	1~65535
CT Ratio [8]	PM_SA + 300028	2	Float	1~65535

- **Modbus Module**

  This block stores the Modbus TCP/RTU module I/O channel data in PMC-5151. The start address of the block is from the SA value. The allocation of the Modbus address of I / O channel for each Modbus TCP/RTU module is in sequence arrangement from the module starting address(SA). Please refer to the following example.

  The Modbus RTU module is connected to COM2 of PMC-5151. Its module index number is 3. So the SA value of the Modbus RTU module in PMC-5151 is 1000 + (3 - 1) x 1200 = 3400. The Modbus address of the I/O channel of the module is in sequence arrangement from the module starting address 3400.



The detailed I/O channel information of the module：

Modbus Data Model	The Starting Address of Modbus RTU Module	Continuous Data Number
Coil Output	11	7
Discrete Input	0	10
Input Register	7	4(32-bit Floating Point)
Holding Register	20	3(32-bit Floating Point)

The allocation of the Modbus Address in PMC-5151 for the Coil Output setting of this Modbus RTU module is shown as below：

Coil Output Index	The Modbus Address in Modbus RTU Module	The mapping Modbus Address in PMC-5151
1	00011	03400
2	00012	03401
3	00013	03402

4	00014	03403
5	00015	03404
6	00016	03405
7	00017	03406

The allocation of the Modbus Address in PMC-5151 for the Discrete Input setting of this Modbus RTU module is shown as below：

Discrete Input Index	The Modbus Address in Modbus RTU Module	The mapping Modbus Address in PMC-5151
1	10000	13400
2	10001	13401
3	10002	13402
4	10003	13403
5	10004	13404
6	10005	13405
7	10006	13406
8	10007	13407
9	10008	13408
10	10009	13409

The allocation of the Modbus Address in PMC-5151 for the Input Register setting of this Modbus RTU module is shown as below：

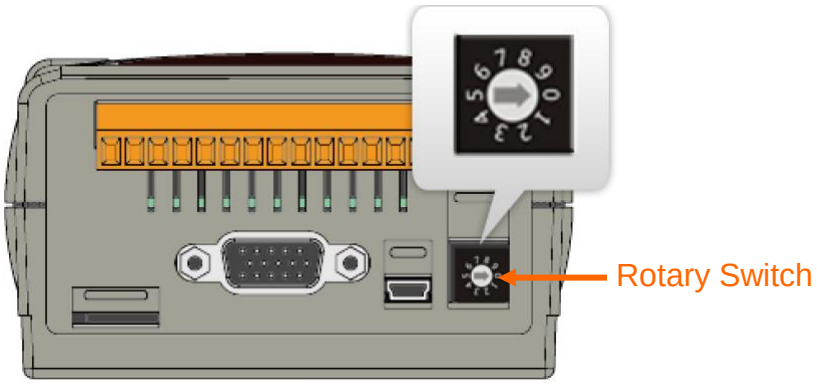
Input Register Index	The Modbus Address in Modbus RTU Module	The mapping Modbus Address in PMC-5151
1	30007	33400
2	30009	33402
3	30011	33404
4	30013	33406

The allocation of the Modbus Address in PMC-5151 for the Holding Register setting of this Modbus RTU module is shown as below：

Holding Register Index	The Modbus Address in Modbus RTU Module	The mapping Modbus Address in PMC-5151
1	40020	43400
2	40022	43402
3	40024	43404

Appendix II：Reset to Factory Default Setting and send password to Administrator

During the operation of PMC-5151, if the hardware system setting data is lost or encounters any abnormal problem that you would like to reset the system to factory default, please switch the Rotary Switch to specific positions to restore factory settings or to ask PMC-5151 to send the login password to the Email account of the Administrator. In addition, you can switch the Rotary Switch to the specific position to delete the data logger files and reset the accumulated values of the power meter which connect to PMC-5151. The following figure shows the location of the Rotary Switch of the PMC-5151.



The function of the position of the Rotary Switch：

	Rotary Switch	Function
	7	Restore network settings to factory default.
	8	■ Send the login password to the Email account of the Administrator. ■ Delete the data logger files and reset the accumulated values of the power meter.

Please follow the steps below to restore network settings to factory default or send the login password to the Email account of the Administrator:

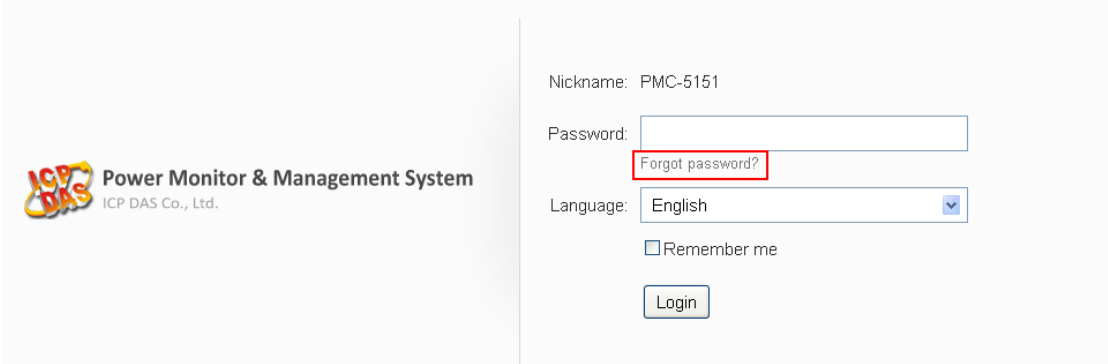
- Restore network settings to factory default
  1. Power off the PMC-5151.
  2. Switch the Rotary Switch to position 7.
  3. Power on the PMC-5151, when the RUN/PWR LED Indicator turns to be

Orange(ON state), it indicates that the setting is completed.

IP Address	LAN1：192.168.255.1 LAN2：192.168.255.2
Subnet Mask	255.255.0.0
Gateway	192.168.0.1
DNS	8.8.8.8
Port for Web Server	80
Port for Modbus TCP	502
Modbus TCP NetID	1

4. Switch the Rotary Switch to position 0

- Send the login password to the Email account of the Administrator
  1. Switch the Rotary Switch to position 8.
  2. Connect to PMC-5151 Login webpage via Web browser. Now a “Forget password” messaage will be displayed under the password field. Click the “Forget password” messaage, then the system will send the both passwords of the Administrator and the General User to the Email account of the administrator that was previously set by the user in “6.3 Security Setting” section

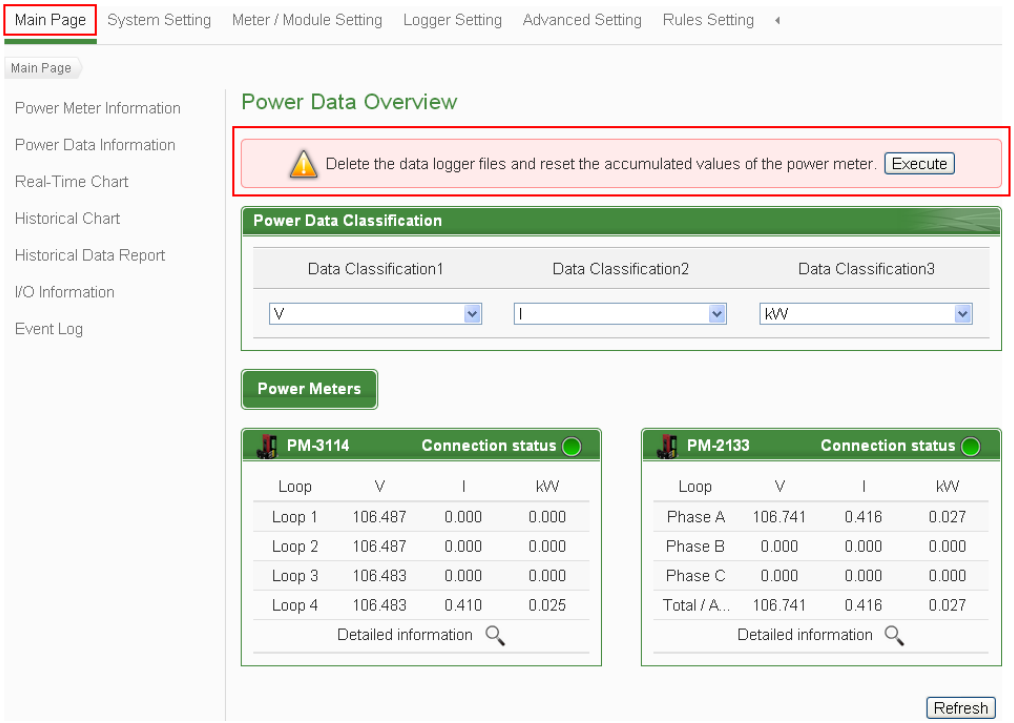


The following figure illustrate an example of the Email the PMC-5151 sends to the Email account of the Administrator. The Email content will include the password of the Administrator, the password of the General User and the password of the FTP Server of PMC-5151.

```
Administrator password is "Admin".
Guest password is "User".
Local FTP password is "Admin".
```

3. Switch the Rotary Switch to position 0.

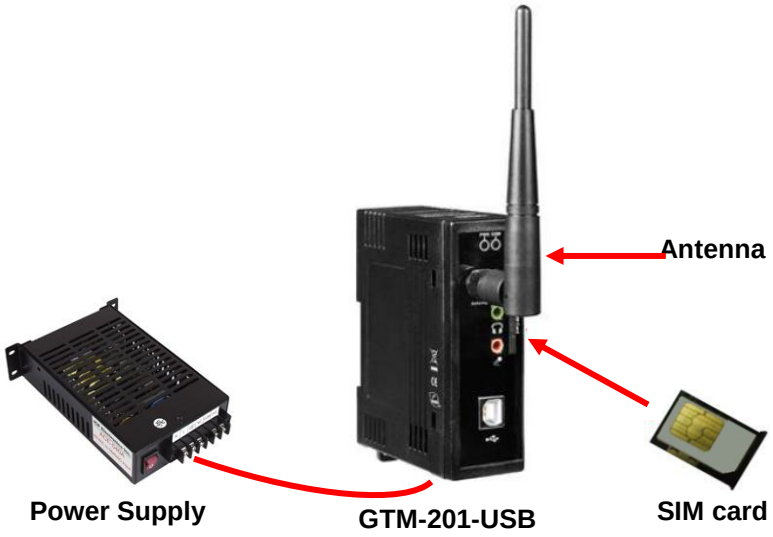
- Delete the data logger files and reset the accumulated values of the power meter.
  1. Switch the Rotary Switch to position 8.
  2. Connect to PMC-5151 login webpage via Web browser, and login as the Administrator.
  3. After login into the system, the message box of “Delete the data logger files and reset the accumulated values of the power meter” will be displayed in the PMC-5151 Main page. Click the “Execute” button for the reset and files delete operation.



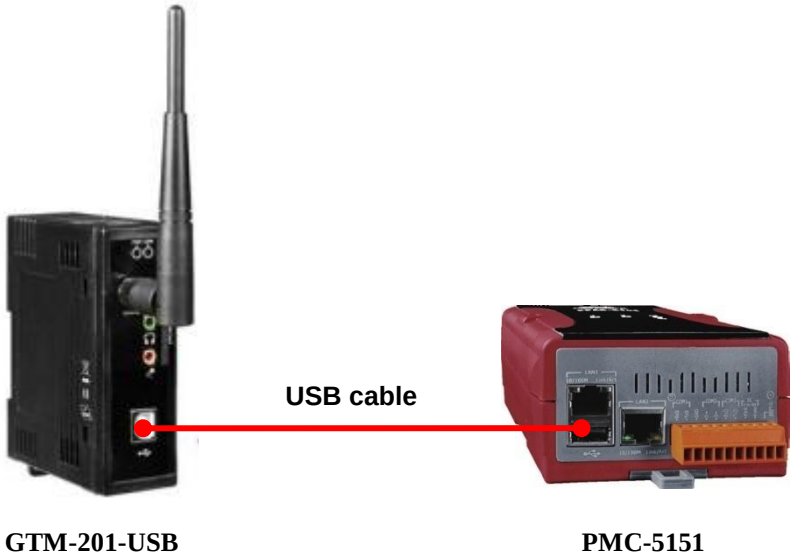
  4. Switch the Rotary Switch to position 0.

Appendix III：Setup the GTM-201-USB with PMC-5151

- Hardware installation
  1. Install the SIM card and antenna on the GTM-201-USB, and connect the device with Power($+10V_{DC}$ ~ $+30V_{DC}$).



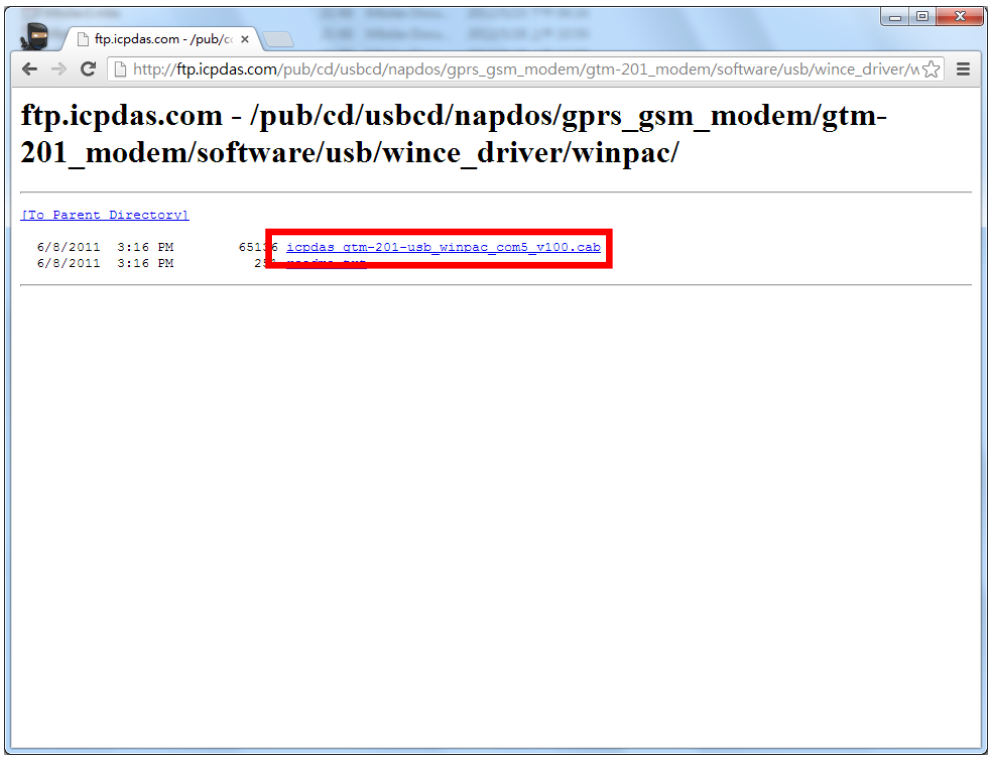
  2. Connect the GTM-201-USB and PMC-5151 by USB cable.



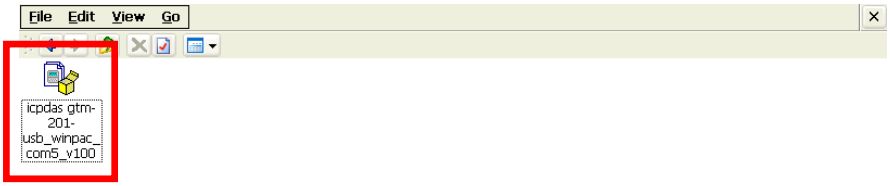
Please Note：The driver of GTM-201-USB has been pre-installed on PMC-5151; user doesn't need to install it. If user wants to install it again, please follow the process as below.

- GTM-201-USB Driver Installation：

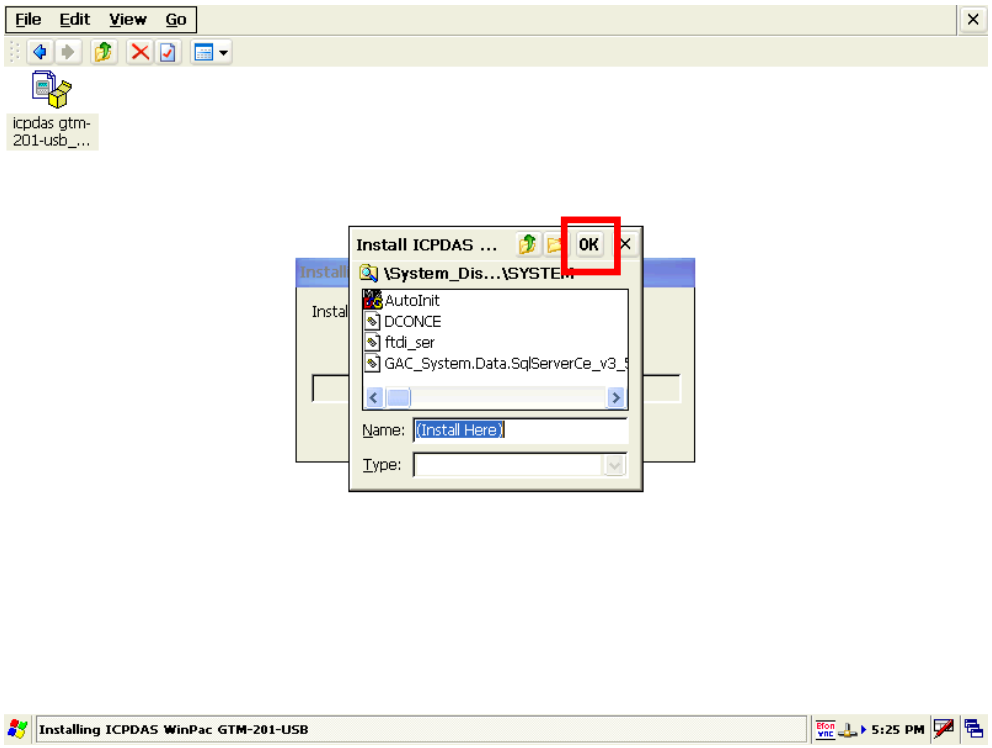
1. Goto the link as below to download the latest version of GTM-201-USB driver installation file.
   http://ftp.icpdas.com/pub/cd/usbcd/napdos/gprs_gsm_modem/gtm-201_modem/software/usb/wince_driver/winpac/



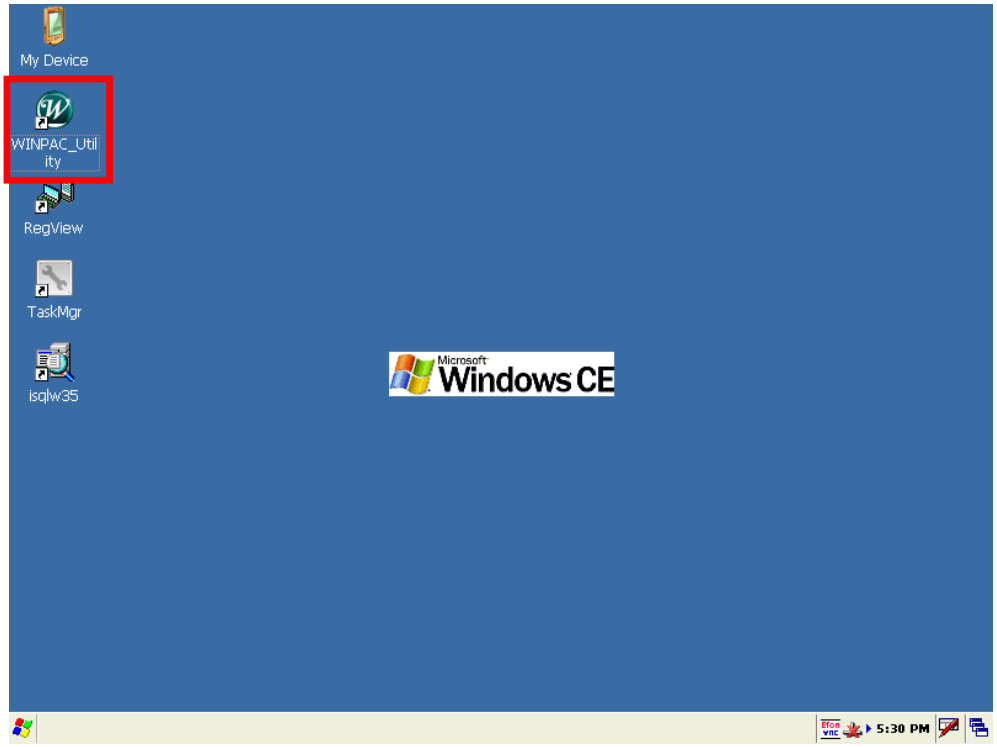
2. Copy the driver installation file to PMC-5151, and double click it to install the driver.



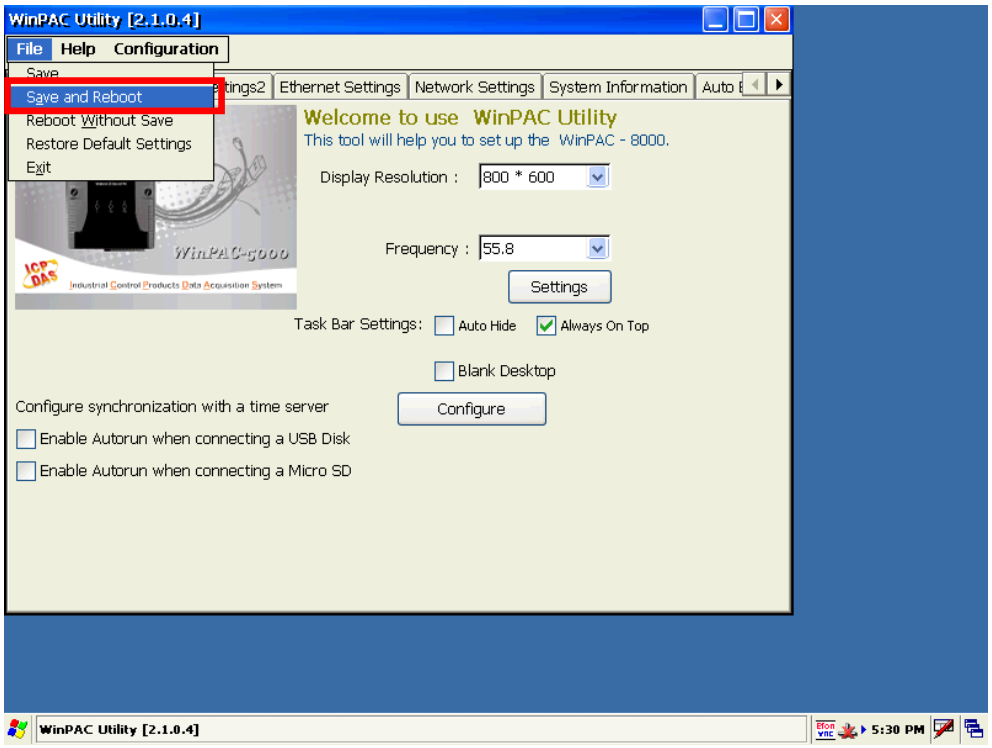
3. Click “OK”button, and waiting for the installation process be completed.



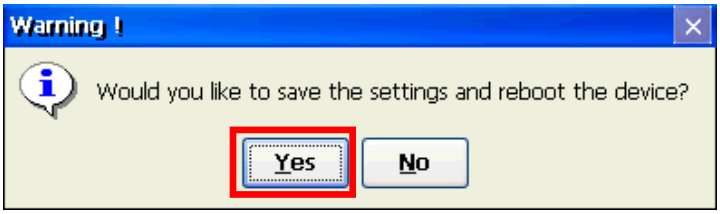
4. Launch WINPAC_Utility.



5. Select “Save and Reboot” of the File menu.



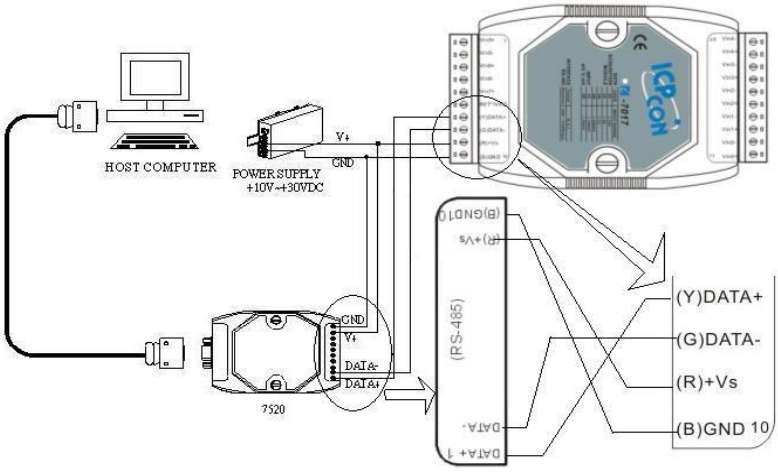
6. Click “Yes” button to reboot PMC-5151. When the reboot process is completed. The driver will take effect.



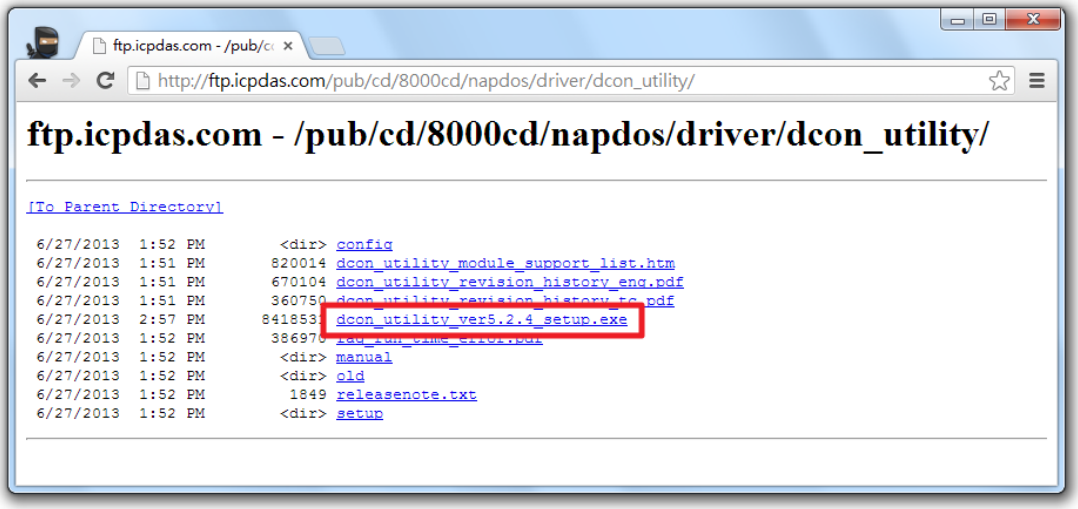
Appendix IV：The configuration setting of M-7000 module

PMC-5151 allows connection to ICP DAS M-7000 modules for the I/O channel data settings and data retrieve. However, for other configuration of the M-7000 modules must be completed via DCON Utility in advance, so that the PMC-5151 can accurately connect to M-7000 module. The procedures for M-7000 module parameter settings are as follow:

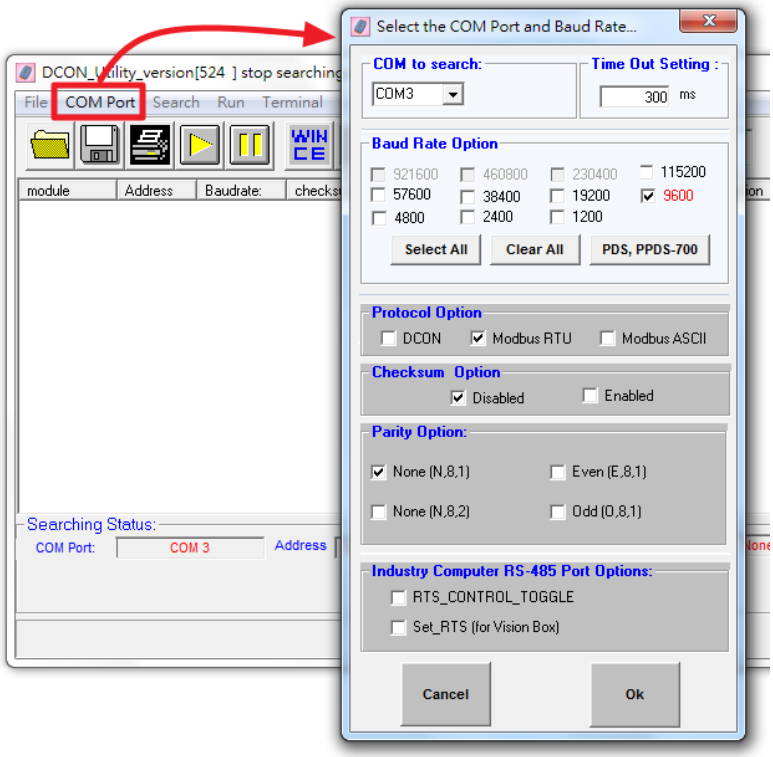
1. Connect the M-7000 modules to the PC (with DCON Utility installed) via RS-485 cable, make sure the RS-485 cable is properly connected. For PC to receive RS-485 signals, a RS-232 to RS-485 or a USB to RS-485 converter is required. For more converter information, please refer to ICP DAS converter product page:
   http://www.icpdas.com/root/product/solutions/industrial_communication/converter/converter_selection.html



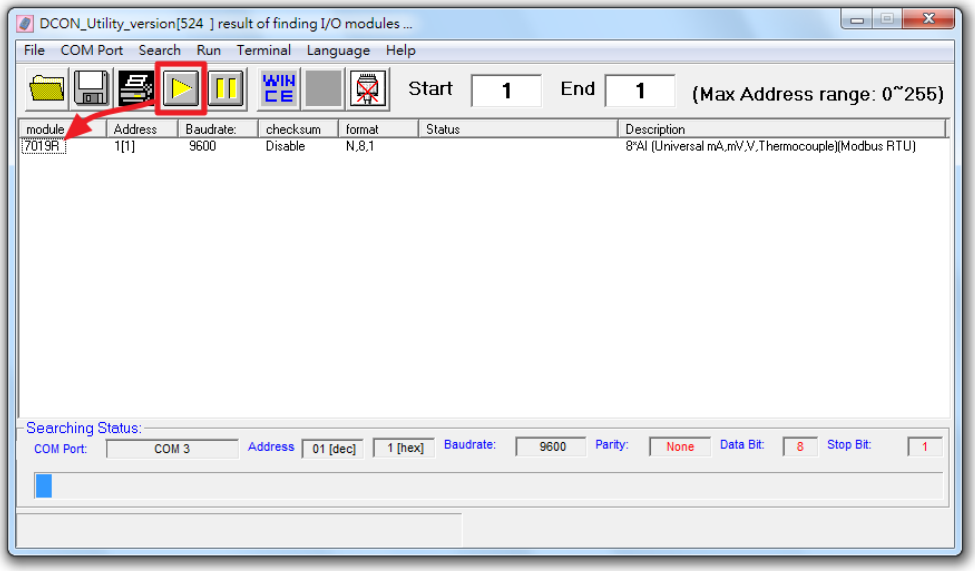
2. You can download DCON Utility from the link below, and Install the DCON Utility on PC
   http://ftp.icpdas.com/pub/cd/8000cd/napdos/driver/dcon_utility/



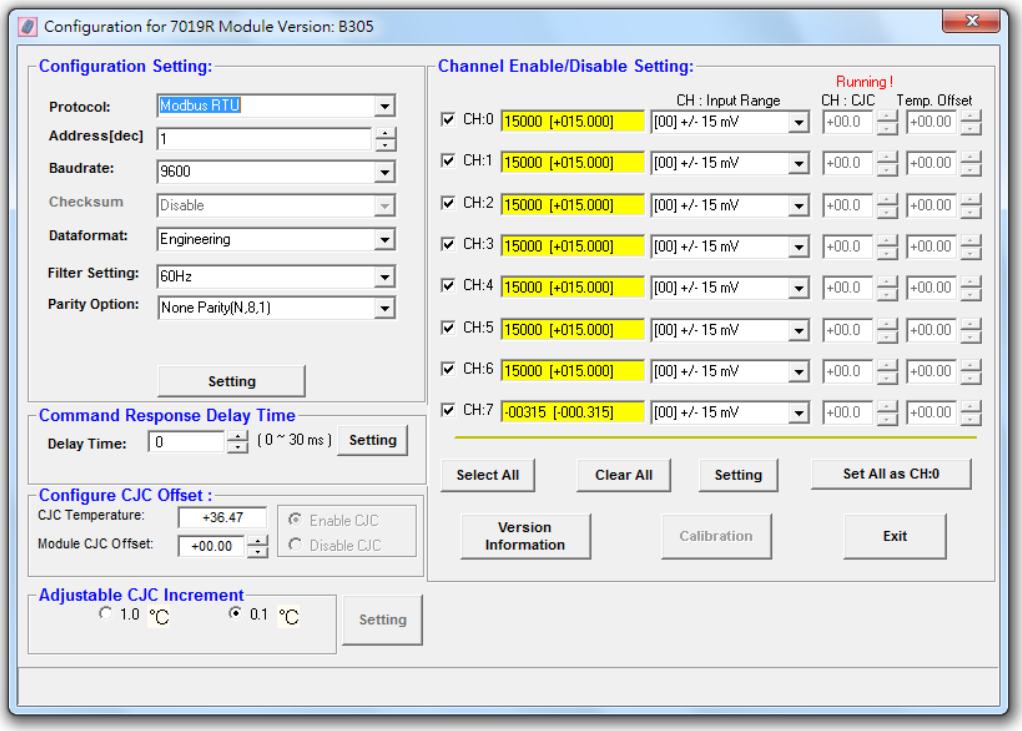
3. Start the DCON Utility and verify if the COM Port parameters are accurate.



4. Perform “Search” to find all M-7000 modules that are connected to the PC.


DCON_Utility_version[524] result of finding I/O modules ...
File COM Port Search Run Terminal Language Help
Start 1 End 1 (Max Address range: 0~255)
module Address Baudrate: checksum format Status Description
7019R 1[1] 9600 Disable N,8,1 8*AI (Universal mA,mV,V,Thermocouple)(Modbus RTU)
Searching Status:
COM Port: COM 3 Address 01 [dec] 1 [hex] Baudrate: 9600 Parity: None Data Bit: 8 Stop Bit: 1

5. Click on the M-7000 module to bring up the "Configuration Window" and setup the parameters (such as Address, Baudrate) for the module. The "Configuration Window" will be shown as follow (using M-7019R as an example):


Configuration for 7019R Module Version: B305
Configuration Setting:
Protocol: Modbus RTU
Address[dec] 1
Baudrate: 9600
Checksum Disable
Dataformat: Engineering
Filter Setting: 60Hz
Parity Option: None Parity(N,8,1)
Setting
Command Response Delay Time
Delay Time: 0 (0 ~ 30 ms) Setting
Configure CJC Offset :
CJC Temperature: +36.47
Module CJC Offset: +00.00
Enable CJC
Disable CJC
Adjustable CJC Increment
1.0 °C 0.1 °C
Setting
Channel Enable/Disable Setting:
Running !
CH : Input Range CH : CJC Temp. Offset
CH:0 15000 [+015.000] [00] +/- 15 mV +00.0 +00.00
CH:1 15000 [+015.000] [00] +/- 15 mV +00.0 +00.00
CH:2 15000 [+015.000] [00] +/- 15 mV +00.0 +00.00
CH:3 15000 [+015.000] [00] +/- 15 mV +00.0 +00.00
CH:4 15000 [+015.000] [00] +/- 15 mV +00.0 +00.00
CH:5 15000 [+015.000] [00] +/- 15 mV +00.0 +00.00
CH:6 15000 [+015.000] [00] +/- 15 mV +00.0 +00.00
CH:7 -00315 [-000.315] [00] +/- 15 mV +00.0 +00.00
Select All
Clear All
Setting
Set All as CH:0
Version Information
Calibration
Exit

Please note: The following parameters has to be accurate to connect with PMC-5151 properly:

- Communication Protocol: has to be set as Modbus RTU.

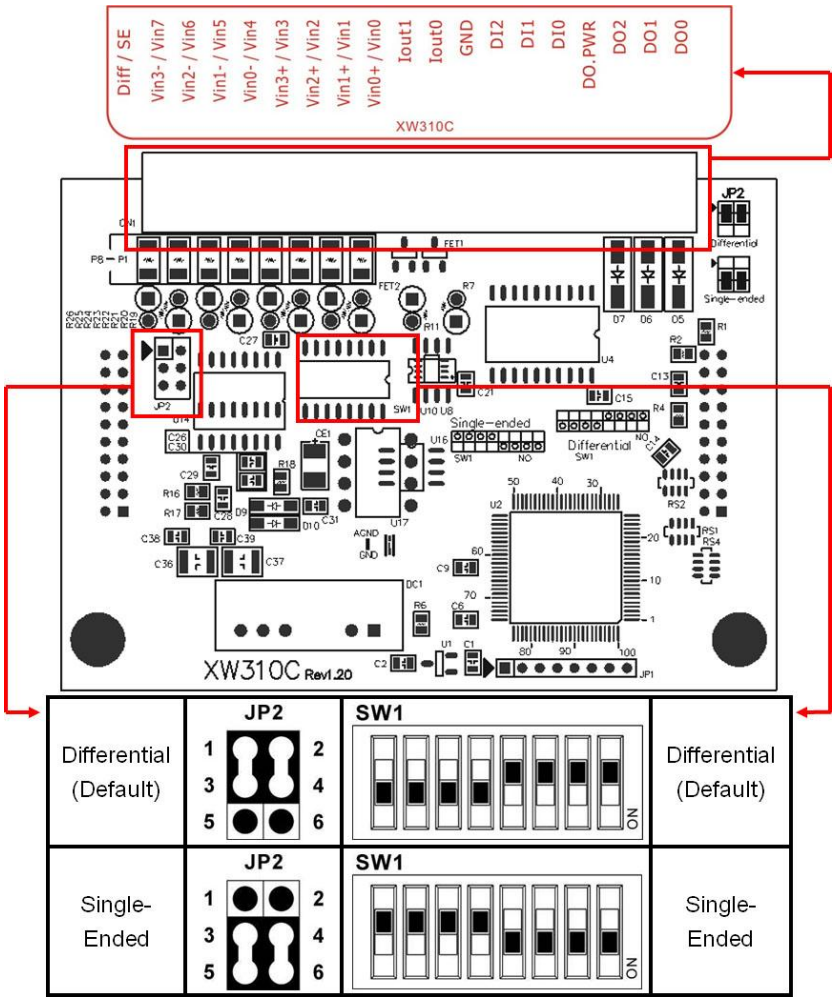
- Address: the address has to be set between 1~64, please note: the configuration of M-7000 module address on PMC-5151 has to be set exactly the same.
- Baudrate: the Baudrate has to be set the same as the Baudrate of PMC-5151 COM Port which the module will connect. All M-7000 modules' Baudrate have to be set the same as well
- Data format: set to be "Engineering" format.

Please complete others setting of M-7000 module according to system's requirement. For more detailed information, please refer to DCON Utility manual as below.

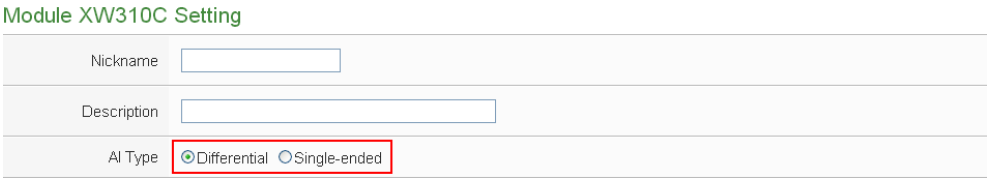
http://ftp.icpdas.com/pub/cd/8000cd/napdos/driver/dcon_utility/manual/

Appendix V：The AI Channel setting of XW310C

The XW310C provides the Differential and Single-Ended operation modes for the AI channel. User can switch the operation modes by change the positions of the Jumpers and Switchs of the XW310C. Please refer to the figure as below for detailed information.



After complete the hardware setting, remember to complete the setting of XW310C AI channel operation mode on PMC-5151 Web page as well(shown as below).



Appendix VI：The SNMP Variables for PMC-5151

The PMC-5151 provides SNMP (Simple Network Management Protocol) Agent to work with the SNMP Network Management software for monitoring the system data, power meter data and I/O module data. The following table lists the SNMP variables for the PMC-5151.

- **RFC1213 MIB II Supported SNMP Variables**

The following SNMP variables are built into the PMC-5151 SNMP Agent and are compliant with RFC1213 MIB II.

MIB II	**System**	SysDescr	SysObjectID	SysUpTime
		SysContact	SysName	SysLocation
		SysServices		
	Interface	IfNumber	ifIndex	ifDescr
		IfType	ifMtu	ifSpeed
		ifPhysAddress	ifAdminStatus	ifOperStatus
		ifLastChange	ifInOctets	ifInUcastPkts
		ifInNUcastPkts	ifInDiscards	ifInErrors
		ifInUnknownProtos		ifOutOctets
		ifOutUcastPkts	ifOutNUcastPkts	ifOutDiscards
		ifOutErrors	ifOutQLen	ifSpecific
	IP	ipForwarding	ipDefaultTTL	ipInReceives
		ipInHdrErrors	ipInAddrErrors	ipForwDatagrams
		ipInUnknownProtos		ipInDiscards
		ipInDelivers	ipOutRequests	ipOutDiscards
		ipOutNoRoutes	ipReasmTimeout	ipReasmReqds
		ipReasmOKs	ipReasmFails	ipFragOKs
		ipFragFails	ipFragCreates	ipAdEntAddr
		ipAdEntIfIndex		ipAdEntNetMask
		ipAdEntBcastAddr		ipAdEntReasmMaxSize
		ipRouteDest	ipRouteIfIndex	ipRouteMetric1
		ipRouteMetric2	ipRouteMetric3	ipRouteMetric4
		ipRouteNextHop	ipRouteType	ipRouteProto
		ipRouteAge	ipRouteMask	ipRouteMetric5
		ipRouteInfo		pRoutingDiscards

	ICMP	icmpInMsgs	icmpInErrors	icmpInDestUnreachs
		icmpInTimeExcds	icmpInParmProbs	
		icmpInSrcQuenchs	icmpInRedirects	icmpInEchos
		icmpInEchoReps	icmpInTimestamps	
		icmpInTimestampReps		icmpInAddrMasks
		icmpInAddrMaskReps		icmpOutMsgs
		icmpOutErrors		icmpOutDestUnreachs
		icmpOutTimeExcds		icmpOutParmProbs
		icmpSrcQuenchs	icmpRedirects	icmpOutEchos
		icmpOutEchoReps		icmpOutTimestamps
		impOutTimestampReps		impOutAddrMasks
		impOutAddrMaskReps		
	TCP	tpRtoAlgorithm	tcpRtoMin	tcpRtoMax
		tcpMaxConn	tcpActiveOpens	tcpPassiveOpens
		tcpAttempFails	tcpEstabResets	tcpCurrEstab
		tcpInSegs	tcpOutSegs	tcpRetransSegs
		tcpConnState	tcpConnLocalAddress	
		tcpConnLocalPort	tcpConnRemAddress	
		tcpConnRemPort	tcpInErrs	tcpOutRsts
	UDP	UdpInDatagrams	UdpNoPorts	UdpInErrors
		UdpOutDatagrams	UdpLocalAddress	UdpLocalPort
	SNMP	SnmpInPkts		snmpOutPkts
		snmpInBadVersions		snmpInBadCommunityNames
		snmpInBadCommunityUses		snmpInASNParseErrs
		snmpInTooBigs		snmpInNoSuchNames
		snmpInBadValues	snmpInReadOnlys	snmpInGenErrs
		snmpInTotalReqVars		snmpInTotalSetVars
		snmpInGetRequests		snmpInGetNexts
		snmpInSetRequests		snmpInGetResponses
		snmpInTraps		snmpOutTooBigs
		snmpOutNoSuchNames		snmpOutBadValues
		snmpOutGenErrs		snmpOutGetRequests
		snmpOutGetNexts		snmpOutSetRequests
		snmpOutGetResponses		snmpOutTraps
		snmpEnableAuthenTraps		

- **Private MIB File and SNMP Variables**

PMC-5151 provides the SNMP Agent can be used to monitor the system status, power meter status and I/O module status with the SNMP Network Management software. You can find the PMC-5151 SNMP MIB file on the Software CD or from the ICP DAS PMMS Web site.

PMC-5151			
System	serialNumber	firmwareVersion	nickname
	systemCurrentTime	webserverPort	modbusTcpPort
	modbusTcpNetID	microSDFreeSpace	xwBoardAmount
	powerMeterAmount	ioModuleAmount	demandInterval
	contractCapacity	carbonFootprintFactor	
	modemStatus	registerStatus	signal
Power Meter1 (On Com2)	com2pm1Index	com2pm1Interface	
	com2pm1ModbusID	com2pm1Name	
	com2pm1PTIndex	com2pm1PTValue	com2pm1PTIndex
	com2pm1CTValue	com2pm1PollingTimeout	
	om2pm1DOAmount	com2pm1RetryInterval c	
	com2pm1ScanRate	com2pm1StatusCode	
	com2pm1ChSubmeterIndex	com2pm1ChName	
	com2pm1ChVoltage	com2pm1ChCurrent	
	com2pm1ChKW	com2pm1ChKvar	com2pm1ChKVA
	com2pm1ChPF	com2pm1ChKWh	com2pm1ChKvarh
	com2pm1ChKVAh	com2pm1ChActualDemand	
	com2pm1ChForecastDemand	com2pm1ChMaxDemandH	
	com2pm1ChMaxDemandD	com2pm1ChMaxDemandM	
	com2pm1ChElectricityD	com2pm1ChElectricityM	
	com2pm1ChElectricityY	com2pm1DOIndex	
	com2pm1DOName	com2pm1DOValue	
	com2pm1HarmonicSubmeterIndex	com2pm1HarmonicSelector	
	com2pm1HarmonicVTHD	com2pm1HarmonicITHD	

The SNMP Variables naming rule of the Power Meter connected with PMC-5151.

- Every power meter that is connected to PMC-5151 provides the SNMP Variables as above (with its specific prefix denoted).
- **The SNMP Variables naming rule of the power meters** on Com2

  The Power Meter1 SNMP Variables are shown as above (with prefix **com2**pm**1**), the Power Meter2 SNMP Variables are similar to listed information above but with prefix **com2**pm**2** instead**,** and the Power Meter16 SNMP Variables are also similar to the listed information above but with prefix **com2**pm**16** instead**.**
- **The SNMP Variables naming rule of the power meters** on Com3

  The Power Meter1 SNMP Variables are similar as listed information above but with prefix **com3**pm**1,** the Power Meter2 SNMP Variables are similar to listed information above but with prefix **com3**pm**2** instead**,** and the Power Meter16 SNMP Variables are also similar to the listed information above but with prefix **com3**pm**16** instead**.**
- **The SNMP Variables naming rule of the power meters** on LAN

  The Power Meter1 SNMP Variables are similar as listed information above but with prefix **lan**pm**1, t**he Power Meter2 SNMP Variables are similar to listed information above but with prefix **lan**pm**2** instead**,** and the Power Meter16 SNMP Variables are also similar to the listed information above but with prefix **lan**pm**16** instead**.**

xwBoard	xwBoardName		xwBoardDIAmount
	xwBoardDOAmount		xwBoardAIAmount
	xwBoardAOAmount	xwBoardDIIndex	xwBoardDIName
	xwBoardDIValue		xwBoardDICounterType
	xwBoardDICounterInitValue		xwBoardDICounterValue
	xwBoardDOIndex	xwBoardDOName	xwBoardDOValue
	xwBoardDOPowerOnValue		xwBoardDOAdvFunction
	xwBoardAIIndex	xwBoardAIName	xwBoardAIValue
	xwBoardAIType		xwBoardAIDeadband
	xwBoardAIScaleMin		xwBoardAIScaleMax
	xwBoardAOIndex	xwBoardAOName	xwBoardAOValue
	xwBoardAOType		xwBoardAOPowerOnValue
I/O Module1(On Com2)	com2io1Index		com2io1Interface
	com2io1ModbusID		com2io1ModuleName
	com2io1ConnectionStatus		com2io1DiscInputAmount
	com2io1CoilOutputAmount		com2io1InputRegAmount
	com2io1HoldingRegAmount		com2io1DiscInputIndex

	com2io1DiscInputName	com2io1DiscInputValue
	com2io1DiscInputModbusAdd	com2io1DiscInputCounterValue
	com2io1DiscInputResetCounter	com2io1CoilOutputIndex
	com2io1CoilOutputName	com2io1CoilOutputValue
	com2io1CoilOutputModbusAdd	com2io1CoilOutputAdvFunction
	com2io1InputRegIndex	com2io1InputRegName
	com2io1InputRegValue	com2io1InputRegModbusAdd
	com2io1InputRegType	com2io1InputRegScaleRatio
	com2io1InputRegOffset	com2io1InputRegDeadband
	com2io1InputRegScaleMin	com2io1InputRegScaleMax
	com2io1HoldingRegIndex	com2io1HoldingRegName
	com2io1HoldingRegValue	com2io1HoldingRegModbusAdd
	com2io1HoldingRegType	com2io1HoldingRegScaleRatio
	com2io1HoldingRegOffset	com2io1HoldingRegDeadband

The SNMP Variables naming rule of the I/O modules that are connected to PMC-5151.

- Every I/O module that is connected to PMC-5151 provides the SNMP Variables as above (with its specific prefix denoted).
- **The SNMP Variables naming rule of the I/O modules** on Com2

  The I/O Module1 SNMP Variables are shown as above (with prefix **com2**io**1**), the I/O Module2 SNMP Variables are similar to listed information above but with prefix **com2**io**2** instead**,** and the I/O Module16 SNMP Variables are also similar to the listed information above but with prefix **com2**io**16** instead**.**
- **The SNMP Variables naming rule of the I/O modules** on Com3

  The I/O Module1 SNMP Variables are similar as listed information above but with prefix **com3**io**1,** the I/O Module2 SNMP Variables are similar to listed information above but with prefix **com3**io**2** instead**,** and the I/O Module16 SNMP Variables are also similar to the listed information above but with prefix **com3**io**16** instead**.**
- **The SNMP Variables naming rule of the I/O modules** on LAN

  The I/O Module1 SNMP Variables are similar as listed information above but with prefix **lan**io**1, t**he I/O Module2 SNMP Variables are similar to listed information above but with prefix **lan**io**2** instead**,** and the I/O Module16 SNMP Variables are also similar to the listed information above but with prefix **lan**io**16** instead**.**

otherInfo	irIndex		irName	irValue	
	pueIndex	pueName	pueTotalEnergy	pueITEnergy	pueValue